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Clinical Use of Streptomycin in the Treatment of Tuberculosis*

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In January, 1944, streptomycin was first described by Schatz, Bugie and Waksman¹ of Rutgers University. It is an antibiotic substance produced by cultures of a member of the Actinomyces group. In December, 1944, Feldman and Hinshaw² reported that it had a strikingly suppressive effect in controlling experimental tuberculosis in guinea pigs. It appeared to be more effective than any of the sulfone drugs, such as promin and diasone, previously used in experimental tuberculosis, and it was much less toxic for guinea pigs.

In the autumn of 1944, our research group instituted treatment of pulmonary tuberculosis with streptomycin. Extensive pharmacologic studies were made to determine the absorption, distribution and toxicity of the drug.³

*Abstract of paper read before the American College of Chest Physicians, San Francisco, July 1946.

**In collaboration with Dr. Magnus Petersen.

***Streptomycin utilized in the studies on pulmonary tuberculosis has been supplied by Merck & Company, the Abbott Laboratories and the Upjohn Company. From March 1, 1946, to September 1, 1946, all streptomycin utilized was supplied by the Committee on Chemotherapeutics and Other Agents of the National Research Council, Chester S. Keefer, Chairman.

More than 100 patients affected with tuberculosis in its various forms have been treated at the Mayo Clinic, at the Rochester State Hospital** and at Mineral Springs Sanatorium.*** This report, however, is concerned with a series of thirty cases of pulmonary tuberculosis in which streptomycin was administered for from two to six months. Patients receiving collapse therapy which affected the lesions under study are not included in this group. All of these patients were under sanatorium or hospital care and management. The amount of exercise permitted the patients was based on the clinical requirements of the individual and was not altered because of the chemotherapy.

With few exceptions the patients who were selected for this investigation had tuberculosis that was progressive or did not respond to rest in bed.

DOSE

The daily dose varied from 1.0 to 4.0 gm. It was divided into doses which were given every three to six hours by intramuscular or deep subcutaneous injection. At the present time we feel that the minimal therapeutic dose is approximately 1.0 gm. daily, although much larger doses, as much as 5 or 6 gm. for many weeks, have been well tolerated in some cases. The ideal dose probably lies somewhere between these limits. Treatment usually has been continued for from two to six months in this series of cases.

TOXICITY

Streptomycin usually causes some pain at the site of injection, but this is not much more severe than that produced by penicillin. Streptomycin is much less toxic to human beings than promin or diasone. It does not adversely affect the hematopoietic system and neither anemia nor leukopenia has resulted from its use. It seldom causes serious reaction, even in cases in which large doses are administered for many weeks. We have noted rare instances of transient deafness, and in a majority of cases a temporary disturbance of equilibrium has developed.⁴ These symptoms tend slowly to subside even while treatment is being continued. The undesirable side reactions which we have seen may be the result of impurities and not necessarily caused by the streptomycin per se. Numerous clinical laboratory tests as well as several postmortem examinations have thus far failed to reveal any critical deleterious effects on the liver or kidneys.⁵ More complete judgment of the actual toxicity of streptomycin must be deferred until adequate supplies of chemically pure streptomycin permit comprehensive pharmacologic studies.

In twenty of the thirty cases of pulmonary tuberculosis selected,

the disease was far advanced; in eight, it was moderately advanced, and in two, it was minimal. Cases were selected in which the lesions were either progressive or had failed to improve with routine care. In all but two of the cases a reasonable period of observation preceded treatment.

RESULTS

In attempting to analyze the results of therapy with streptomycin in this group, we have based our judgment chiefly on changes noted in serial roentgenograms. The results were classified into five categories: (1) marked and unexpected improvement, (2) moderate improvement, (3) slight improvement, (4) no change and (5) worse. These results are indicated in table 1. It appears

TABLE 1
*Streptomycin in Treatment of Pulmonary Tuberculosis:
Results Based on Roentgenographic Findings*

Classification of tuberculosis before treatment	Results of treatment				
	Improvement			No change	Condition worse
	Marked	Moderate	Slight		
Far advanced	9	2	5	4	0
Moderately advanced	4	3	1	0	0
Minimal	0	2	0	0	0
TOTAL	13	7	6	4	0

significant that none of the roentgenograms of these patients indicated extension of the lesions of tuberculosis during the time the drug was being administered. The lesions which showed the most rapid improvement were usually of exudative character. The improvement evidenced roentgenologically was sufficiently prompt and occurred so consistently as to indicate that the drug does have a suppressive effect on the development of the disease process. Three to six months after administration of the drug was stopped, there was some exacerbation of the disease in four cases. This fact tends to strengthen the evidence for a suppressive action of the drug.

Bacteriologic studies, including cultures and inoculations of guinea pigs with gastric contents, are not sufficiently complete at this time to permit us to tabulate the results in full. Reversal of sputum from positive to negative usually has been achieved except in those cases in which the disease was predominantly fibrocaseous and associated with cavitation.

The symptoms of active tuberculosis, including fever, malaise, cough, expectoration and loss of weight, have frequently disappeared rapidly, but this may be due in part to the improved morale incident to alteration of treatment.

COMMENT

Streptomycin yielded results more encouraging than any of the other drugs which we have previously utilized in the treatment of tuberculosis.⁶ Its use appears to favor the healing process in a large percentage of the patients treated despite the fact that these patients were selected because of an apparently unfavorable prognosis.

Streptomycin resembles other modern antibacterial agents in suppressing the multiplication of sensitive organisms without complete eradication of the infection. As a result, there is a tendency for the disease process to recur following cessation of streptomycin treatment in a chronic disease such as pulmonary tuberculosis. We believe that streptomycin may serve an important function in conjunction with other forms of treatment but that it should not be regarded as a substitute for well-established conventional forms of treatment.

COMENTARIO

La estreptomicina dio resultados más alentadores que cualquiera de las otras drogas que habíamos utilizado anteriormente en el tratamiento de la tuberculosis.⁶ Su empleo parece ayudar el proceso de cicatrización en un alto porcentaje de los enfermos tratados, a pesar del hecho de que estos enfermos fueron escogidos precisamente porque su pronóstico parecía ser desfavorable.

La estreptomicina se parece a otros agentes antibacterianos modernos en que suprime la multiplicación de los gérmenes sensibles sin erradicar completamente la infección. Por esta razón tiende a recaer el proceso morboso cuando se termina el tratamiento con la estreptomicina en una enfermedad crónica como la tuberculosis pulmonar. Somos de opinión que la estreptomicina puede desempeñar una función importante cuando se usa con otros tratamientos, pero no debe ser considerada como sustituto por otras terapias convencionales y bien establecidas.

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Discussion

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The studies on streptomycin just reported present an admirable example of scientific therapeutic assay. Instead of rushing ahead with uncontrolled human experimentation, information was obtained under laboratory conditions which will be of the greatest importance in aiding in the evaluation of the probable value of the drug and also in determining just how it should be tried out on humans and what may be expected from it. Bacteriological studies on the effect of streptomycin on not merely one altered laboratory strain of tubercle bacilli but a wide diversity of strains, both standardized stock cultures and freshly isolated field growths from various types of tuberculous lesions, tested in vitro on various media and under various conditions, have shown not only the sensitivity of the organism to this agent, but also the development of resistance to it which could be only speculated upon clinically. The administration of various doses over various time periods by different routes to experimental animals, mice, guinea pigs, rabbits, yields information of great importance on the toxicity and effectiveness of the agent and the manner in which it should be tried on humans. It is to be hoped that the human experiments next to be reported may be equally well controlled, not only by comparison with equivalent cases who do not receive the drug, but by psychological as well as physical control measures to prevent the subjective errors due to *spes phthisica* in the patient as well as the effect of non-specific effects generated in the course of the experimental observations.

The fact that the studies so far reported have not resulted in the finding of an immediate and unqualified "sterilisans magna" against the tubercle bacillus should not make us neglect the lesser values which may be revealed. Even though it be true that streptomycin is bacteriostatic rather than bactericidal against the acid

fast bacillus in the body, so that its effect is transitory rather than permanent, that the organisms gradually develop resistance against it so that they eventually may multiply and progress even though the drug were continued, and that the agent is so expensive and so difficult to obtain that only a few patients may possibly be treated with it for limited periods only, it nevertheless seems to mark an important advance in phthiseotherapy. For example, the effect of streptomycin on localized lesions, such as skin or mucous membrane tuberculosis, where the agent can be brought in high concentrations, or as a temporary aid just before extensive chest surgery or lobectomy, to lessen the chances of spillage and spread during the procedure, should be investigated. The use of gold salts seemed indicated from in vitro tests which could not be sustained by animal experiments. The use of promin and other sulfones seemed promising from animal experiments but have failed of general benefit in clinical cases. The use of streptomycin seems even more promising in the in vitro, animal and human cases so far reported but will require further study to show just when it may be of real value. These advances, however, should lend renewed support to further studies, such as those of Pfuetze and his associates, and here in California of Friedlander, Proescher, Smith, and our own Olive View efforts in this direction.

Continuous Immobilization of the Lungs by Residence in the Equalizing Pressure Chamber in the Treatment of Pulmonary Tuberculosis*

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Studies on the physiology of respiration have resulted in profound modifications of the breathing pattern of man in various pulmonary diseases. When dyspnea is due to lack of oxygen, inhalation of oxygen-enriched atmospheres results in relief of dyspnea due to diminution in the volume of breathing. In clinical entities characterized by respiratory obstruction the inhalation of helium with oxygen is responsible for a decreased physical effort although the total volume of ventilation may be unchanged. Similarly, the physical effort of breathing is decreased in obstructive dyspnea when atmospheres are inhaled under positive pressure. Cessation of all chest movement may be produced by hyperventilation with 100 per cent oxygen, after which the normal individual may show arrest of lung movement for periods as long as five minutes without cyanosis or discomfort. The chemical regulation of breathing depends on an adequate exchange of oxygen and carbon dioxide between the pulmonary capillaries and the outside air.

In 1926 Thunberg¹ constructed the barospirator in which an alternating pressure of one-sixth of an atmosphere was produced 25 times a minute. A person enclosed in a chamber of this type obtained an adequate pulmonary ventilation. The device was used to maintain artificial respiration in patients with polio-myelitis in whom respiratory paralysis had taken place. The principle of the method depends on the physical law that the number of gas molecules in a container, with the volume and temperature constant, varies with the degree of pressure to which the gas is exposed. If the lungs contain 3000 cc. at the end of a normal expiration, an increase of pressure of one-sixth of an atmosphere would result in an increase in the number of gas molecules present in them equivalent to the inlet of 500 cc. of air. When the pressure wave

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is reversed, with a decrease in pressure of one-sixth of an atmosphere, a corresponding decrease in the number of molecules in the lung takes place comparable to expiration. Although slight chest movement may be observed in normal subjects, our studies indicated that the walls of the thoracic cage were flexible and that an initial compression was observed when the positive pressure wave was applied to the thorax and conversely a slight expansion of the chest during the negative phase.

When patients with pulmonary disease were studied, alternating pressure by itself resulted in a variable compression and expansion of the chest depending upon the degree of constriction of the passageway between the nose and the pulmonary alveoli. In patients with asthma and pulmonary emphysema the effect of alternating pressure was a marked increase and decrease in the volume of the chest. It was also observed that expansion of the chest took place during the negative phase of pressure, during which time the influence of the rarefaction of air was toward the elimination of air from the lungs. In other words, in cases with constriction in the bronchial passageway the inspiratory cycle was expanding the lungs at a time when an opposite influence was being exerted, i.e., withdrawing air from the lungs.

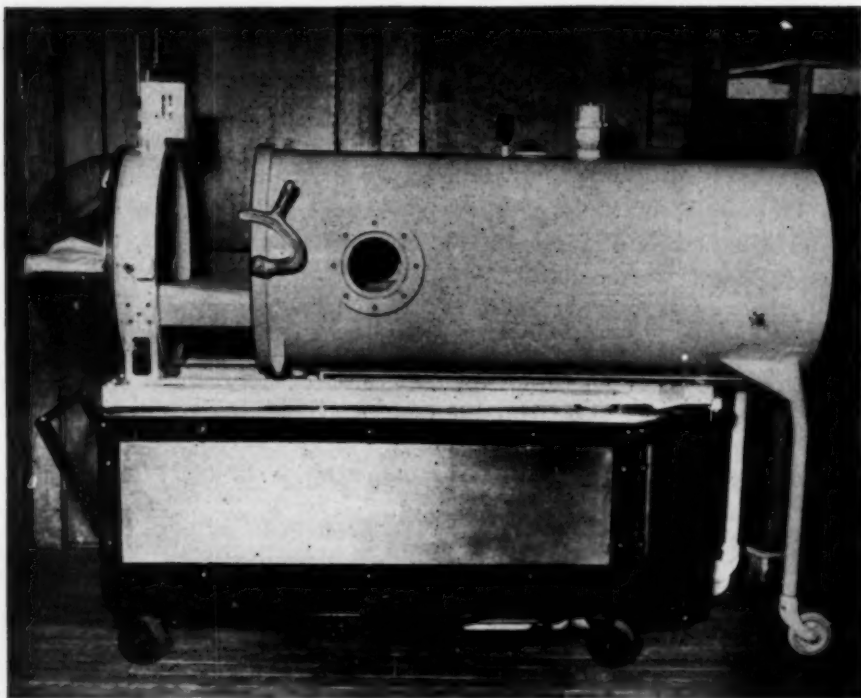


FIGURE 1

Equalizing pressure chamber with ventilation and air-conditioning apparatus suspended under the body compartment.

Since the air which enters the lungs swiftly builds up a pressure on the inner surface of the chest and on the upper surface of the diaphragm, a certain time interval was necessary to equalize the pressure on both sides of the chest wall. Furthermore, the resistance in the tracheo-bronchial tree was observed to consume about 5 cm. of water pressure. In the first chamber of this type the patient was placed in a chamber within a chamber and the air was passed through small holes in the inner chamber so that the total pressure arriving on the external surface of the chest wall was 5 cm. less than that which entered the head compartment and arrived at a fraction of a second later in time.^{2,3,4,5} Subsequently

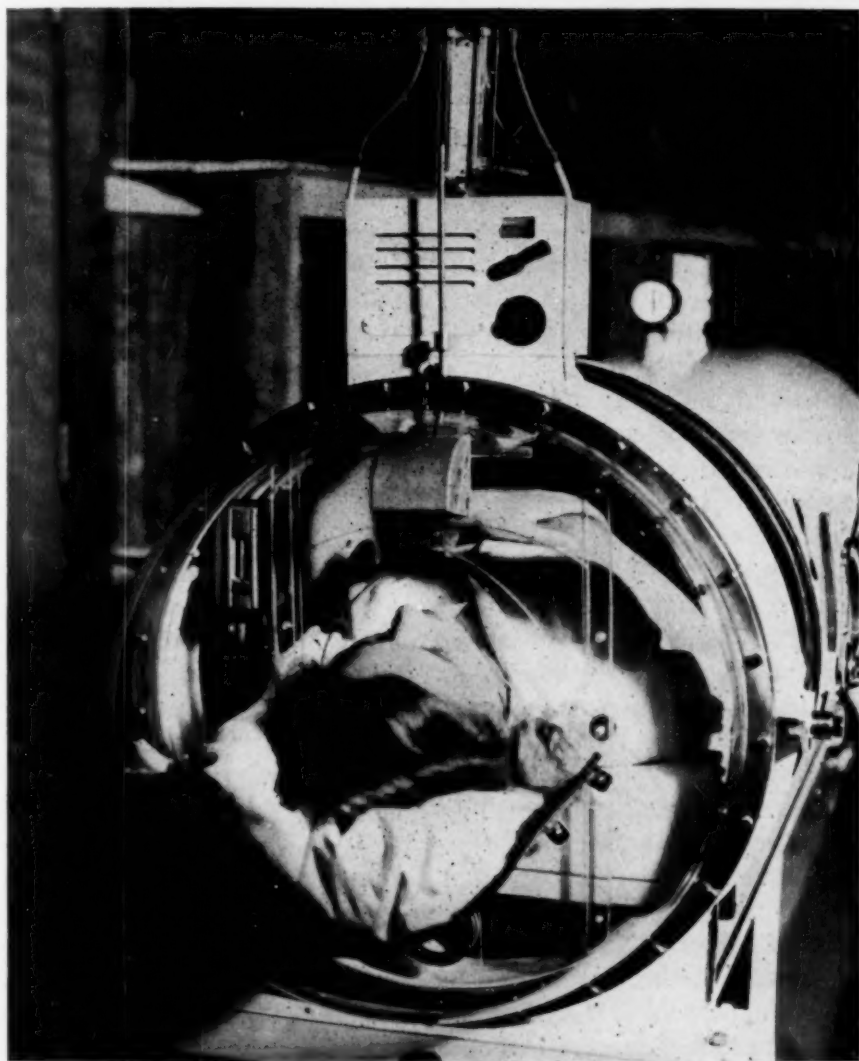


FIGURE 2

Transparent plastic hood on the equalizing pressure chamber.

a suitable chamber was used in which the air pressure wave entered the head end of the chamber first and then passed through a moveable partition surrounding the neck of the patient into the body end. In this chamber (Figs. 1 and 2) the patient is completely enclosed, the pressure wave arriving in the head compartment and then, momentarily delayed and slightly decreased in total pressure arrives at the body compartment.

It was soon found that patients not only were able to reside comfortably in the chamber without chest movement, but also that they were able to hold their breath for indefinite periods of time. When these patients were exposed to alternating pressure alone the impulse to breathe recurred after variable periods. Furthermore, in experimental respiratory paralysis in dogs, it was shown that alternating pressure alone did not maintain a normal arterial oxygen saturation and CO_2 tension. A progressive increase in anoxia and retention of CO_2 in the blood took place until equalizing pressure was added, when an increase of oxygen and decrease of CO_2 was produced. Previous studies^{2,3,4,5,6,7,8,9} indicated that equalizing pressure therapy was not only, therefore, more efficient in maintaining a chemo-respiratory exchange, but also was required to produce continuous arrest of chest movement. When immobilization of the lungs has been produced in the trained subject, an increase in the rate of cycling may wash out carbon dioxide beyond that required. In the cases treated in our series spontaneous breathing asserts itself within 10 to 15 seconds after the patient has discontinued equalizing pressure therapy. In many instances, spontaneous breathing begins immediately. In no case has there been symptoms of alkalosis. Residence in the immobilizing pressure chamber, therefore, provides a form of lung rest which is not obtainable in any other way. From the known experience in healing of pulmonary tuberculosis, the treatment, such as is made possible by equalizing pressure chamber therapy, would appear to be physiologically sound.

METHODS

When the chamber is opened the patient reclines and pulls his head through the aperture between the body and head compartment. The neck is surrounded by a soft towel and the partition lowered to approximately 1 cm. from the neck. The alternating pressure motor is then turned on and the gauge is observed to determine whether a pressure of 53 to 55 mm. Hg is present. The water manometer is then inspected and if a pressure of plus 5 cm. H_2O is indicated, the patient is observed to see whether any gross movement of the chest wall is present. When the pressure is initially found to be other than 5 cm. the partition is moved up and

down until the water level in the manometer arrives during the positive cycle to a point 2.5 cm. above the level of the atmosphere. (This is generally marked on the water manometer as 5 cm., since an equal and opposite excursion takes place on the other arm of the manometer).

The pressure is thus slightly higher as it arrives in the nose or mouth, also earlier in time than that which exerts itself on the chest wall and abdomen. Since this decrease of pressure applied to the chest wall is ultimately made equal to that which is consumed in the respiratory passageway, a comparable pressure is maintained on both sides of the thorax, and on the upper and lower surfaces of the diaphragm simultaneously. No movement of the chest wall should take place in patients who have learned to arrest their breathing. Minimal alterations in volume of the lungs may occur, but these are obviously of exceedingly small degree when compared to the chest expansion and contraction in ordinary respiration. It should be understood that the lungs are not compressed any more than they would be in an individual swiftly ascending to an altitude 1400 feet above sea level. There is alternate compression and rarefaction of the air within the respiratory system, which achieves an inflow and outflow of approximately 500 cc. of air.

The actual introduction of the patient into the technique of arresting lung movement is of considerable importance. The patient is dressed lightly so that his chest is exposed when he is in the machine. The exact alternating pressure used may vary but a rate of 28 times a minute with an alternating pressure of 52 to 54 mm. Hg is generally best suited to the average patient. The dial on the body end of the chamber reveals the *alternating* pressure, which can be modified by a control in the box containing the motor blower unit. The partition, which is raised or lowered from the outside until a +5 cm. water pressure is indicated on the manometer, regulates the equalizing pressure.

At the start the patient is told, through the connecting phone, to take a breath each time the pressure turns to the positive phase. This is conveniently done by raising the hand as the pressure starts toward the positive phase, as revealed by the dial; it may also be revealed to the patient by a colored ribbon attached to the head end of the chamber. In other words, when the hand is elevated the patient takes a small breath and when it is lowered the patient exhales slightly for three or four breaths. When the ribbon is attached to the head end of the chamber the patient is instructed to take a small breath when the ribbon is thrown upward and to exhale when the ribbon comes down. After he has breathed in this fashion, i.e., *with the machine*, he is instructed

to draw in less and less air until he takes in none at all. It will then be found that he will be able to stop breathing perhaps for two or three minutes. In some cases it is equally effective to tell the patient simply to take three or four breaths and then stop breathing after a normal expiration.

If the patient begins to breathe, he may find himself inhaling when the negative pressure phase is present. This is undesirable since he will be then expanding his lungs at a time when the air will be rarefied and therefore coming out of his lungs. The patient may or may not be aware that he is not breathing with the machine. He is then instructed by the nurse or technician, or doctor, to start again and breathe at first with the rhythm of the machine, i.e., taking a small breath when the ribbon goes upward for two or three times and then ceasing to breathe again. After a variable period, in some cases several hours, in others three or four days, the patient learns to arrest all movement and the chest becomes quieter and quieter until little or no chest movement is seen.

In individuals who have a full abdomen a slight quivering of the abdomen is observed due to alternate compression and expansion of the gas in the intestine as the pressure changes from positive to negative. This does not mean that diaphragmatic movement is present because pressure on the abdomen is transmitted to the undersurface of the diaphragm and is there met by an opposing pressure coming in from the nasal passage.

The sensation on the eardrums is that of going up and down in an elevator and this is perceived by patients at first with slight discomfort, but gradually the patients themselves become oblivious of the alternating pressure effect on the eardrums. In some cases pain will be experienced and the treatment may then be stopped for a day or two and then continued. In no instance has it been necessary to terminate treatment because of the effect of oscillating pressure on the eardrum. A radio-phone or rubber earpiece is used by some patients. A pressure effect on the sinuses may be felt due to the fact that the orifices between the nasal cavity and the various accessory sinuses are not always patent. In some cases congestion of the sinuses and a feeling of stuffiness of the nose may be present for several days. This may be dealt with by spraying the nose with $\frac{1}{4}$ per cent neosynephrine or half strength privine in the morning before going into the chamber and in the afternoon as well. The treatment itself may be stopped for a day, or two or three days, if the congestion in the sinuses persists and then chamber treatment again instituted. In none of 12 patients who have been treated for periods of four months at a time, some of them for two courses, has either the pressure effect on the sinuses or eardrums resulted in cessation of immobilizing therapy.

The length of a course of treatment has been arbitrarily set at three and one-half to four months since in many of the cases treated substantial improvement took place by this time. Longer courses of therapy may be desirable in certain patients since relapse has taken place in some patients who have stopped treatment at the end of this time and necessitated a second course. The duration of treatment is the major part of the day, such as from 9 to 1 in the morning, 2 to 6 in the afternoon and 7 to 9:30 in the evening. In the patients who responded favorably, 8 to 11 hours a day of immobilizing lung therapy has been used. In the majority of patients, although not in all, no treatment was given on Sunday. This interruption of treatment for one day a week is theoretically less desirable than continued treatment. However, some of the patients that have done well have had treatment only 6 days a week. In some cases this has been due to the inability to provide supervision on Sundays. Some of the patients have expressed a desire to be treated every day without interruption.

Patients may cough in the chamber in a suitable receptacle. The effect of absence of lung movement is to decrease the impulse to cough and in some cases, after the first three or four weeks of treatment, there has been x-ray evidence of puddling of the secretions with slight increase in infiltration suggesting a small area of atelectasis. It may be an improvement in technique to ask these patients to cough three times a day when they are taken out for meals.

The cooperation of the patient is in our experience invariably obtained as soon as he has learned to arrest all spontaneous lung movement. The restlessness which patients frequently have during routine rest in bed is apt to disappear as soon as ventilation of the lungs takes place without effort or chest movement. Patients are not generally bored; they do not require anyone to read to them, nor do they usually demand entertainment in other ways. It is possible for them to listen to a radio if they wish. The feeling of relaxation is such that voluntary movements of the extremities, so common in ordinary bed rest are few and far between in patients treated in the equalizing pressure chamber. Furthermore, even in those people in whom smoking has become an urgent habit, the desire to smoke is not present when breathing is accomplished by the machine and not by chest movement.

The patient himself very frequently gains confidence and encouragement from the fact that he can feel his chest with his hands and determine that his lungs are not moving. Since he has been taught that rest is a healing therapy in the disease, the fact that he can immobilize his own lungs often gives him new hope that something more profoundly curative is being done than the

ordinary bed rest to which he has been previously exposed. This is especially true in many of the chamber treated patients who had previously witnessed their disease getting worse, even with as much body rest as they were able to obtain.

CLINICAL RESULTS

In this communication the clinical results of 11 cases previously reported in part will be reviewed and an additional case very recently treated will be presented.

Of the 11 cases treated in the equalizing pressure chamber the first case was in the chamber for a period of approximately two months, 5 hours a day. Although slight improvement was evident, this was not maintained after discharge from the hospital. The second patient was treated for a period of three and one-half months and following this course obtained a full clinical recovery. The accompanying x-ray photograph (fig. 3) shows the degree of clearing that took place before and 17 months after treatment. Sufficient clearing had taken place at the end of three months to warrant the assumption that continued improvement might occur. This patient has had negative sputa for six years and with the exception of one period of three months bed rest has been at work. He has been more fully described as Case 1 in an earlier publication.⁸ Another patient who was treated with a single course of three and one-half months therapy was apparently free from disease at a city hospital subsequently. Although numerous sputum tests have been negative the appearance of a single positive test led to pneumothorax therapy which was soon abandoned. His follow-up observation for a period of one year did not reveal re-

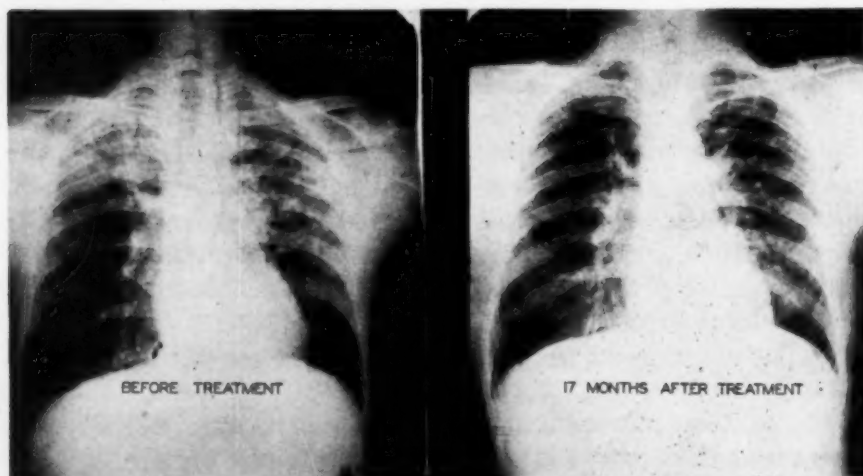


FIGURE 3

X-ray before and 17 months after one course of treatment in Case 2.

currence of the disease (Fig. 4). (Case 3 in an earlier publication⁸).

There were two patients who had two separate courses of treatment before clinical recovery took place. In the first one (Fig. 5) the follow-up results have been carefully observed for a period of 4 years, the patient being at work in our hospital, sputum tests having been consistently negative. (Case 5 in an earlier publication⁸). In the second case that was treated for two separate courses, the follow-up observation included one year during which sputum tests were negative (Fig. 6). (Case 9 in reference 8).

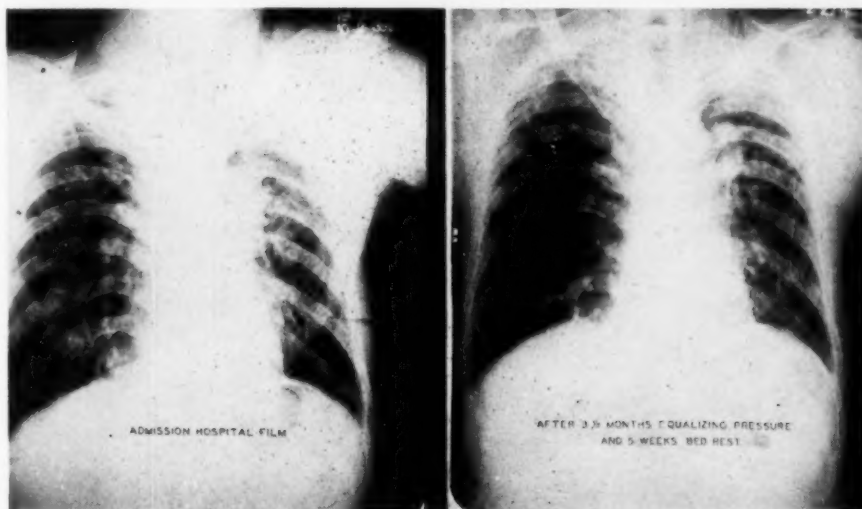


FIGURE 4

X-ray before and after one course of treatment.

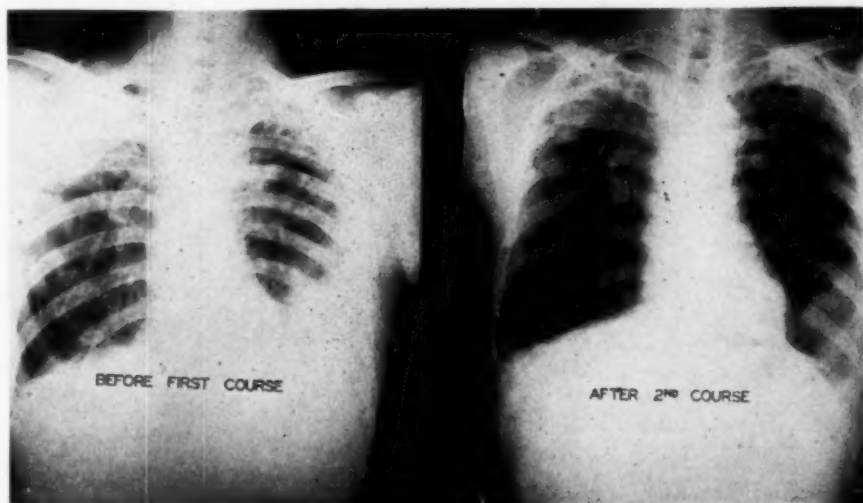


FIGURE 5

X-ray before and after two courses.

The sixth patient of this series, the third who had received two courses of therapy, revealed a collapse of cavity on each course and following his last treatment has had negative sputum tests for three and one-half years. At the site of the original cavity there is now a suspicious highlight that suggests either a cavity or an area of emphysema. He is considered as markedly improved, although not a completely arrested case. The accompanying illustration indicates the condition before the first treatment and after the second treatment (Fig. 7). (Case 4 in reference 8).

One of the recovered cases was treated in three separate courses

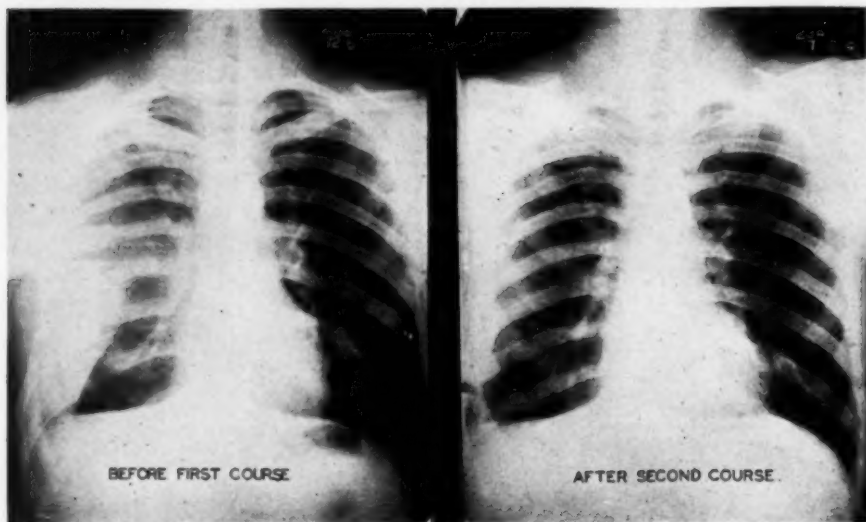


FIGURE 6
X-ray before and after two courses.

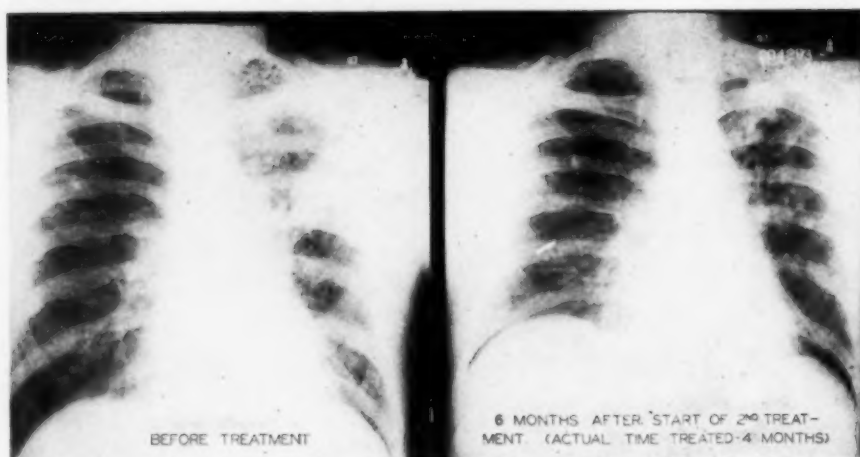


FIGURE 7
X-ray before treatment and 6 months after start of second treatment (actual time treated, 4 months).

and each time closure of cavity was demonstrated. (Case 2 in earlier publication⁸). In the accompanying illustration (Fig. 8) the x-ray picture before treatment and after the third course is shown. In figure 9 the planigraphic film of the cavity before and after 11 weeks of the second course is shown. In this patient during a follow-up period of four years there were consistently negative sputum tests during a time when he was actually engaged in work. Of the remaining cases, three manifested slight to moderate improvement which was not maintained after treatment was terminated (Cases 7, 8 and 9). There were two cases that showed no change as the result of immobilizing pressure treatment. In one of them it was thought that the cavities were adherent to the chest wall. In the other patient a tendency to fall asleep and to assume spontaneous breathing was often noted.

Results of Immobilization of the Lungs in Bilateral Advanced or Moderately Advanced Pulmonary Tuberculosis

	No. of Cases	Clinical Recovery	Marked Improvement	Slight to Moderate Temporary Benefit	No Change
Treated with One Course	8	3	..	3	2
Treated with Two Courses	3	2	1
Treated with Three Courses	1	1
TOTAL	12	6	1	3	2

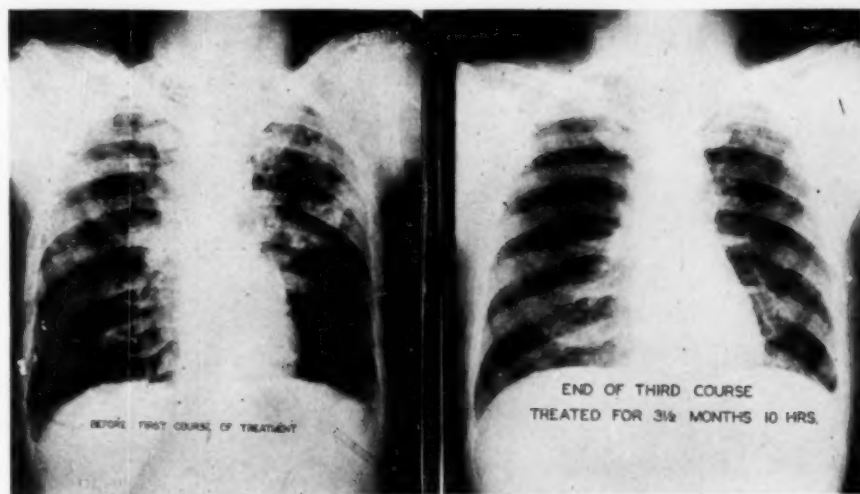


FIGURE 8

X-ray before first and after third course of treatment.

But see Table!

The summary of the cases above briefly reported may be stated as follows: Immobilizing pressure therapy was of no benefit in 2; of slightly moderate benefit of a temporary nature in 3; and of marked benefit in 5, 4 of whom obtained a clinical recovery. The most recent case treated will now be presented.

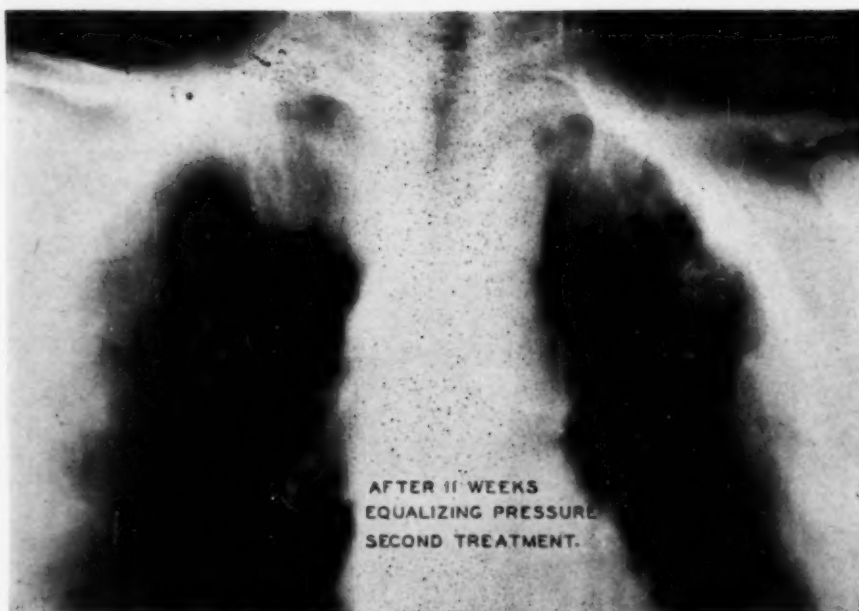
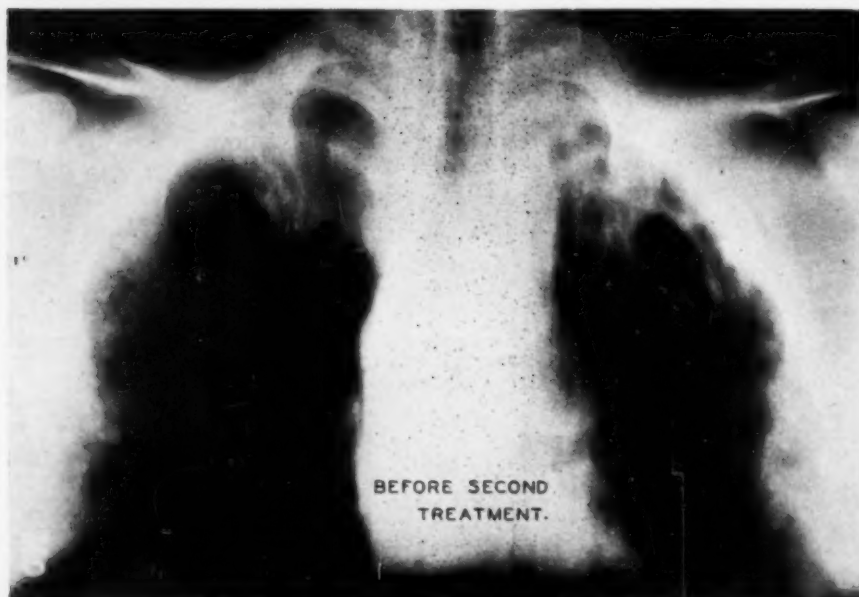


FIGURE 9

Planigraphic x-ray before and after 11 weeks treatment
in the second course.

CASE REPORT

Case 12: A man, 49 years of age developed active pulmonary tuberculosis with positive sputum following an attack of apparent bronchitis that lasted two months. Six years previously the patient had suffered from hemoptysis and a low grade fever for two months. At that time the sputum was consistently negative, but x-ray examination of the chest disclosed a dense, productive and apparently calcified lesion in the right upper lobe. Physical examination of the lungs was now essentially negative except for dullness at the right apex. X-ray showed an increase in the width of the involved area. The sedimentation rate was 50 mm. after 1 hour. Repeated sputum tests were positive. For a year following the diagnosis of pulmonary tuberculosis he was treated with strict bed rest. During the succeeding six months he was allowed very slight activity, such as sitting up two hours in the afternoon and one to two hours in the evening and allowed to walk 50 to 100 steps twice a day. At the end of this time, following a cold and an apparent bronchitis, he developed increasing symptoms and x-ray showed a spread of the disease to the right hilum and right base. The sputum then showed a hemolytic streptococcus on culture and he was treated with 7 injections of 300,000 units of penicillin in beeswax with marked improvement in cough and decrease in sputum. However, during the following year as well as for the six months prior to this time the patients' sputum tests were un-failingly positive each week. Complete bed rest was re-instituted and slight improvement in the x-ray was observed without, however, the development of negative sputum.

At the end of approximately two years of active pulmonary tuberculosis and six months after the spread of the disease from the right upper lobe to the right hilum and right lower lobe, the patient was started on equalizing pressure chamber treatment at home 8 hours a day. In two and one-half weeks the sputum became negative; the concentrate sputum test continued to be negative during the following three months on 12 of 16 examinations. Sputum culture was negative



FIGURE 10

Decrease in infiltration in left hilum, left apex and base after two months immobilizing pressure therapy.

for tubercle bacilli. At the end of two months there was marked improvement in the x-ray as shown in the accompanying photograph (Fig. 10), in which it will be seen that there was contraction of the area at the right apex and marked clearing of the infiltrate between the right border of the heart and the bronchial markings, as well as at the right base. The patient had a hiccoughing episode for a period of 12 hours and for four days thereafter the sedimentation rate and fever were slightly elevated. The total period of treatment was approximately two and one-half months. The patient is now undergoing convalescent care and continues to have negative sputum tests. Although it is too early to decide whether this patient will obtain a complete clinical recovery and permanent arrest of the disease, the response to immobilization of the lungs by residence in the equalizing pressure chamber was swift and dramatic in terms of prompt termination of positive sputum tests, decrease in cough, increase in well being and clearing of lesions by x-ray.

Considerable difficulty was encountered in this patient during the first four days in learning to arrest spontaneous movement of the chest. He had no ear symptoms that bothered him, but he did manifest throughout most of the treatment a stuffiness in his nose and a mucoid discharge from the sinuses. When he was out of the chamber for two or three days this subsided, but recurred during chamber treatment.

It was of interest that after the first full week of treatment the temperature dropped from a range of between 97.6 and 99° F to 96.4 and 98° F. There was a decrease in pulse rate from a range of 78 to 88 to 46 to 60. Since this patient was already well nourished, dietary precautions prevented an undue gain in weight. It may be mentioned at this point that some of the patients previously treated, such as Case 2 of this series, showed a marked gain in weight as the sedimentation rate came to normal, even though there had been no prior weight gain on bed rest. In the accompanying chart (Fig. 11) the gain of weight is shown in Case 1, from 124 pounds to 156 pounds during three and one-half months of treatment.

In a recent analysis of the cases referred to in this series it was pointed out that collapse of cavity was shown to be a specific result of immobilizing therapy in three patients. In the man who had three separate courses of therapy closure of the cavity in the right lung followed the first course of treatment with diminution of the cavities in the left lung. On bed rest the cavities in the left lung subsequently coalesced and formed one large cavity that was closed after the second course of treatment. When the patient returned one year later the cavity had re-expanded and again was shown to collapse after the third course of immobilizing lung therapy with subsequent clinical recovery. In a second case (Case 6 of this series), a large cavity in the left upper lobe closed after four months treatment and reopened and expanded to its original

size subsequently during 5 months of ordinary rest in bed at a municipal hospital. The second course of treatment resulted in closure with the apparent formation of a fibrous scar at the site of the original cavity. In an additional patient, labeled as moderate but temporary improvement, a large cavity in the left upper lobe collapsed during treatment, but expanded to its original size two weeks later on marked activity.

The appraisal of a new remedy in the treatment of pulmonary tuberculosis is fraught with obvious difficulty. In the series of advanced bilateral and moderately advanced cases here presented the conclusion was reached that local lung rest as provided by the equalizing pressure chamber does initiate healing and results in collapse of cavity in some cases that are unresponsive to previous methods of treatment. Further investigation is required to determine the ultimate value in this type of case as well as in earlier forms of the disease that have not been investigated.

In two earlier studies of comparable cases of advanced or moderately advanced pulmonary tuberculosis treated by continuous residence in an oxygen chamber¹⁰ and by residence in a filtered air room,¹¹ the criteria for selection, the source of material and the type of food and nursing care were the same as in this series. Nevertheless, neither clinical recovery nor marked improvement took place in either of these groups, who represent control cases insofar as it is possible to control medical management, hospital

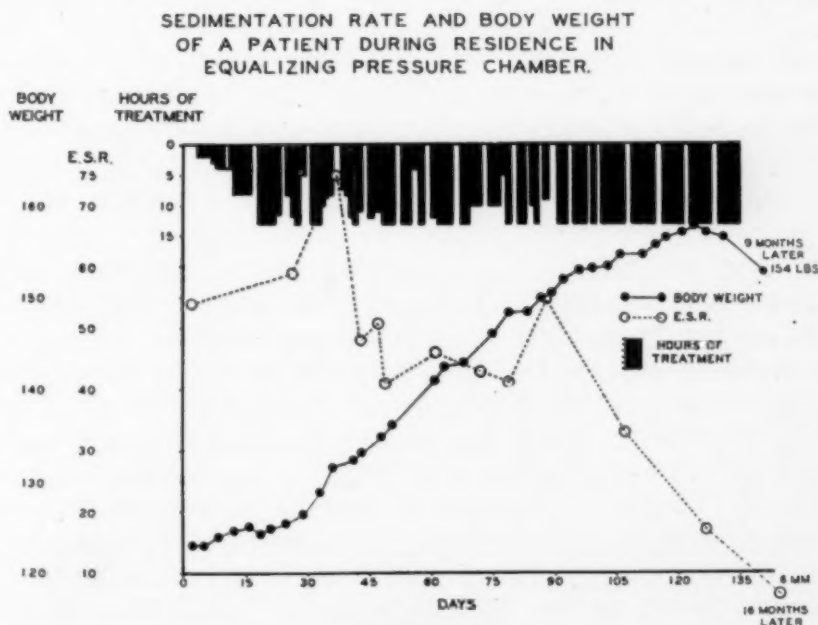


FIGURE 11

Sedimentation rate and body weight of a patient during residence in the equalizing pressure chamber.

routine and nature of the disease. In a comparable period of time, a characteristic therapeutic response was observed in the majority of the cases treated by immobilization of both lungs.

SUMMARY AND CONCLUSIONS

The results of 11 previously treated cases of bilateral advanced or moderately advanced pulmonary tuberculosis have been reviewed and a case history of a patient recently treated has been presented.

Of the 12 cases, 6 obtained a clinical recovery, including the recent case with a short follow-up period of observation.

In one patient three courses of approximately three and one-half to four months each were given, in three other cases, 2 courses of treatment were given and in the remaining 8 cases a single course of therapy was employed.

The provision of local lung rest by residence in the immobilizing pressure chamber promotes the process of healing and closure of cavity in some cases of advanced and moderately advanced pulmonary tuberculosis. This favorable response has been observed in cases for whom no other form of treatment was possible or who had been exposed to other types of tuberculosis therapy without benefit. In comparable groups of cases under the same medical management and in the same hospital, treated either with residence in an oxygen chamber or in a filtered air room, no such therapeutic benefit was observed.

RESUMEN Y CONCLUSIONES

Se repasan los resultados obtenidos en 11 casos de tuberculosis pulmonar bilateral, avanzada o moderadamente avanzada, previamente tratados, y se presenta el protocolo de un enfermo recientemente tratado.

De los 12 casos 6 se repusieron clínicamente, inclusive del caso reciente que sólo cuenta con un corto período de observación.

Un enfermo recibió tres series terapéuticas, aproximadamente de tres y medio a cuatro meses cada una; tres casos recibieron 2 series, y los otros 8 casos una sola serie.

El descanso local del pulmón, proporcionado por la permanencia en una cámara inmovilizadora de la presión, estimula el proceso de cicatrización y el cierre de cavernas en algunos casos de tuberculosis pulmonar avanzada o moderadamente avanzada. Se ha observado este efecto favorable en casos a los que no les podía aplicar ningún otro tratamiento o que habían sido sometidos a otros tratamientos sin beneficio alguno. En grupos comparables de casos, bajo la misma atención médica y en el mismo hospital, tratados mediante la permanencia en una cámara de oxígeno o en un cuarte de aire filtrado, no se observó un beneficio terapéutico semejante.

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Discussion

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Dr. Marach to-day is introducing to us a new approach in the treatment of pulmonary tuberculosis. It is a physiologic approach. It aims to induce local rest in an organ which heretofore could not be immobilized without serious consequences. If the lung stops functioning, oxidation is disurbed and death results. Doctor Barach's chamber by utilizing a fundamental law of physics produces oxygen carbon dioxide exchange without the necessity of expansion or contraction of the lung. It splints the lung without disturbing normal physiologic processes. It is the first time that any one has been able to completely immobilize the lung without hazard.

Rest is the fundamental basis in the treatment of disease and especially tuberculosis. Until some means is found to act directly on the tubercle bacillus and the mechanism in the host that makes him susceptible to clinical tuberculosis, all of us must utilize rest in some form or other to treat our patients who have clinical tuberculosis.

The medical approach so far has been aimed at establishing basal metabolic conditions and thus reduce oxygen want to an absolute minimum. Even though respiratory activity is reduced, the crippled lung must go on functioning so that life may continue.

The surgical approach in the treatment of pulmonary tuberculosis has been aimed at producing a local rest of the diseased area of the lung. However, the great variety of circumstances incidental to clinical tuberculosis frequently do not warrant surgical treatment. It becomes necessary, therefore, to have at our disposal as many modes of approach as possible so that the patient may be benefited in some way or other.

No approach to this problem, be it medical or be it surgical, has produced 100 per cent good results. The combination of one or more methods of treatment has increased the rate of good results.

To-day we learned that there is another way to tackle this problem. This means that a certain group of patients who have not done well by the existing methods of treatment have a little better chance to recover.

Doctor Barach's approach to the subject is based on sound physical and physiological principles. It not only immobilizes the lung but it also carries on a normal respiratory exchange. The lung with its elastic tissue when not distended will have a tendency to contract and cause healing of ulcerative areas. Furthermore, when the patient is housed in the chamber, he becomes more relaxed so that the demands on the body and particularly on the lung are reduced sufficiently to assist in the recuperative processes.

It is true that not all of Doctor Barach's patients have improved sufficiently to be classified as good results. It is also true that the number of cases treated is not sufficiently great so that an unbiased study of the results can be made. However, this is a new method, and because it is based on sound principles, it should be given an opportunity to prove itself one way or the other. This method will offer un an opportunity to study respiration under altered conditions. It will help to study the heart and the peripheral circulation under new circumstances. Personally, I am quite willing and anxious to add to our armamentarium this method of treatment of tuberculosis and perhaps of other diseases of the lungs. As a matter of fact one of these chambers is about to be installed at the Alexian Brothers Hospital in Chicago in a matter of a few weeks. True, it is an expensive apparatus and the maintenance of the chamber requires extra attention. However, it is worth a trial.

In closing I wish to congratulate Doctor Barach on his inventiveness and on his sound physical and physiological background.

The Psychosomatic Factors in Pulmonary Tuberculosis

A Study of One Hundred Consecutive Army Cases*

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The psychological phenomena of patients with chronic infectious illnesses have not been widely studied. Patients with pulmonary tuberculosis represent a special group of chronic infectious disease with regard to social implications and the long duration of treatment. In tuberculosis a long period of bed rest is generally recognized as a fundamental basis for medical and surgical therapeutic procedures. It has long been recognized that recreational and diversional activities, which are not in conflict with therapeutic measures, are of benefit to these patients. An inquiry into the patient's personality type, his desires and conflicts should aid in an understanding of his response to medical care. Such understanding could result in the accomplishment for the individual patient of a more complete therapeutic approach.

Present day interests in psychosomatic problems have not yet been directed actively to this group of cases. In the literature no definite references of work done by psychiatrists are available. However, Weiss and English¹ mention a high incidence of neuroses in patients suffering from pulmonary tuberculosis, and that there appears to be present in some of the cases studied a "strong need for love and protection." Pulmonary tuberculosis has had a point in common with mental illness, in that these diseases were formerly considered social stigmata. Through intellectual endeavor this attitude has been mitigated to a great extent. It is interesting to note that the earliest reported use of group psychotherapy was not with psychoneurotics but with pulmonary tuberculosis patients, instituted in 1905 by Pratt² in Boston.

It is possible that a broader understanding of this problem has not been reached because of the lack of study of a sufficiently cross section group of cases. We have had the opportunity at the Bruns General Hospital, Santa Fe, New Mexico, to observe a large number of cases of pulmonary tuberculosis. These patients have been returned from overseas theaters. It is obvious that these pa-

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tients come from a highly selected group of men who, in the recent past, were physically qualified for overseas duty. These patients previous to their army experience came from all walks of life and from all parts of this country. Since patients are received at the Bruns General Hospital within a few months after the onset or recognition of pulmonary tuberculosis, it was possible to evaluate their responses at a very early period in their disease. This eliminated influencing factors which may be developed by a long period of chronic illness. It is recognized, however, that certain factors related to military life and overseas duty were introduced in these patients. One hundred unselected cases of pulmonary tuberculosis were analyzed for this study. This was twelve per cent of the tuberculosis population of the hospital at the time. All stages and types of pulmonary tuberculosis were included.

An attempt to obtain information by the use of a written questionnaire to be answered by the patient was not successful. The method used in this preliminary study was a personal interview by the neuropsychiatrist. The ward officers were cooperative and most helpful in the study. In every instance the neuropsychiatrist was well received and the patients cooperated fully. The interview lasted approximately one hour. It is realized that by this method the patients' histories may not be as reliable or intimate in detail as a study that would embrace many interviews over a long period of time. However, certain of these data obtained are here presented and appear to be of value.

ANALYSIS OF DATA

Family History (Chart I): In approximately seventy-five per cent of the cases, the parents were native born, the majority of whom lived in rural areas. About fifty per cent of the parents were considered to be in good health. Only four of the fathers were ill with pulmonary tuberculosis while four fathers and three mothers had died of it. Approximately seventy-five per cent of the patients came from homes where the economic adjustment was considered average or above average for the particular locality. Only three of the patients had lost one of their parents in infancy. Twenty-five patients showed preference for the mother, eleven for the father and the remainder showed no preference for either parent. The fathers' vocations were quite varied. Five patients were the only child of the family. In families with more than one child, twenty were the youngest and twenty were the oldest. Seventy-five patients came from homes having four or more children. Only thirty-eight patients gave a history of dead siblings. Eight patients had siblings who suffered from tuberculosis and only three patients had siblings who died from this disease. One patient was a twin

and to our knowledge the other twin is free from tuberculosis. Only one patient would admit to nervousness and one to psychosis in their families.

From the family history it is noted that tuberculosis and mental illnesses were practically negligible; that predominantly the patients sprang from native born parents with average economic adjustment and from larger families with an average health background.

Personal Data: Ninety-six patients were native born, of whom sixty-one were from rural areas. Eighty-five were Caucasians, fourteen were Negroes and one an American Indian. Sixty-five of the group had suffered from the usual childhood diseases. Chart II shows the previous diseases of these patients. Fifty-nine patients gave no history of any previous injury requiring medical aid; thirty showed one injury; seven were injured twice and four were injured three times. Sixty-eight were never operated upon; twenty-two were operated upon once and the remainder more than once. The types of operations and injuries are listed in Chart II.

CHART II—PERSONAL DATA

PREVIOUS ILLNESSES		CIVILIAN INJURIES	
<i>Illness</i>	<i>No. of Patients</i>	<i>Type of Injury</i>	<i>No. of Patients</i>
Measles	64	Explosion causing abdominal injury	1
Whooping Cough	26	Cut below eye	2
Chicken Pox	26	Fractured forearm	1
Mumps	30	Fractured thumb	1
Tonsillitis	4	Fractured wrist	3
Smallpox	7	Injury to left hip	1
Asthma	1	Fractured ankle	2
Scarlet Fever	10	Injury to knee	2
Pneumonia	12	Injury to back	1
Influenza	3	Fractured leg	1
Typhoid Fever	5	Fractured elbow	2
Diphtheria	4	Fractured finger	2
Convulsions in infancy	2	Fractured ribs	3
Convulsions later in life	1	Facial bone fracture	1
Malaria	6	Amputation of finger	2
Rickets	1	Dislocation, both elbows	1
Jaundice	2	Fractured jaw	1
Pleurisy	6	Fractured pelvis	1
Tuberculosis	2	Fractured nose	1
Dysentery	1	Head injury	9
OPERATIONS		Vertebral injury	1
		Dog bite	2
<i>Type</i>	<i>No. of Patients</i>	Laceration of elbow	1
Tonsillectomy	14	Laceration of scalp	5
Hydrocele	1	Laceration of cheek	3
Empyema	1	Fractured arm	1
Hemorrhoidectomy	1	Burn	1
Appendectomy	16	Vertebral fracture	1
Circumcision	2		
Mastoidectomy	1		
Abscess of perineum	1		

The educational background revealed that nine had college education; twenty-five were high school graduates; thirty-five were elementary school graduates and the remainder attended elementary school but did not graduate.

Only nine patients revealed an irregular work history, whereas the others had worked steadily. Their civilian occupations were varied as shown in Chart III. Twenty-five patients averaged less than twenty dollars weekly and twenty-one patients earned between twenty and thirty dollars per week. The remainder earned more than thirty dollars per week. Only three were ever on the WPA or relief rolls.

The marital history showed that thirty-six were married, of whom nine were divorced and three complained of an unhappy marriage. Over fifty per cent of the married group had no children and only four patients of this group had two or more children. In

CHART III — PERSONAL DATA

<i>Occupations</i>	<i>No. of Patients</i>
Gardner	1
Truck driver	8
Power press operator	1
Buyer	1
Embalmer	1
Tenant farmer	4
Farmer	1
Laborer	28
Carpenter	1
Mechanic	4
Saloon keeper	1
Glazer	1
Policeman	1
Electrician	1
Mimeograph operator	1
Salesman	1
Cook	2
Engineer—refrigerator	1
Plumbers helper	1
Counterman	1
Telegrapher	7
Farm hand	1
Statistician	1
Jack-of-all-trades	1
Foreman—transfer company	1
Longshoreman	1
Molder	1
Traffic manager	1
Service man (gas company)	1
Interior decorator	1
Machinist	2
Timekeeper	1
Painter (house)	1
Teacher	1
Orderly	1
Clothing presser	1
Riveter	1
Welder	1

CHART IV — PERSONAL DATA

<i>Hobbies</i>	<i>No. of Patients</i>
Fishing and hunting	12
Tennis	1
Billiards	1
Reading	4
Spectator of sports	1
Golf	2
Card games	3
Chess	1
Checkers	1
Raising cattle	1
Playing all sports	2
Guitar playing	1
Trap shooting	2
Stamp collecting	2
Photography	6
Boxing	3
Wood carving	1
Carpentry	1
Basket ball	5
Football	3
Radio sets (construction)	1
Toy trains (construction)	1
Swimming	4
Book collector	1
Baseball	7
Toy airplanes (construction)	2
Polo	1
Raising chickens	1
Dancing	1
Ice skating	1
Bowling	1
Guns (collector)	1
Automobiles (repair)	1

six patients the sexual adjustment was considered poor. Sixty-four patients never married.

In no case did any patient admit to a history of venereal disease.

Sixteen patients consumed more alcohol than average in civilian life. Their alcoholism, however, did not interfere with their livelihood or adjustment in civilian life. Seventy-four patients were temperate in the use of alcohol and ten were total abstainers. Sixty-three were heavy smokers while six were non-smokers. Seventy-six had active hobbies. The types of hobbies were varied as shown in Chart IV, with fishing and hunting predominating.

- An unusually large number, twenty-three, were unable to dance. Two of the group did not enjoy music. Twenty-one played musical instruments. All of the patients favored light music. Ninety-two were considered to have made a good social adjustment. Eighty-seven of them attended church. Eighty-eight were interested in reading and ninety-one enjoyed the average movie.

The above figures indicate a relatively large number of moderate drinkers and inveterate smokers. Socially, these patients were well adjusted as shown by their interests in hobbies, music, reading, movies and attendance at church.

In order to study the question of neuroses in these patients, a careful evaluation of such history was made. Sixteen patients gave a history of bed wetting, eighteen of biting their nails and twelve talked in their sleep, all of these continuing for sometime after five years of age. Six patients had nightmares after fourteen years of age. Fourteen patients began to suffer from nightmares recently, which in all probability was a result of being in active combat or combat areas. Thirty-one patients were considered to be shy; twenty-six were shown to be irritable for slight cause and six had definite feelings of inferiority. Fifteen patients worried unnecessarily over trivialities. Fifteen patients gave a history of compulsive traits in repeatedly trying the gas jets, electric lights, water faucets and doors. Six were unusually superstitious. Seventy-nine showed evidence of undue cleanliness in relation to their personal hygienic habits, as well as an insistence on orderliness and neatness in civilian life. An unusually large number, thirty patients, gave a history of arrest, eight of which resulted in jail sentences. Speeding, disorderly conduct and bouts of intoxication were the principal offenses among those arrested.

Seventy-four patients adjusted themselves quite well during military basic training. However, in relation to accepting discipline in their military organization, there were a fair number who had difficulties; twenty-three had one or more court-martials; thirty-one received company punishment on one or more occasions, and

thirty-four gave a history of one or more times Absent Without Leave.

The personal data showed that our patients were predominantly native born, came from the rural areas, were prone to the usual childhood diseases, and had a low operative and injury rate. Their educational status, economic and sexual adjustment can be considered average or possibly better than average. These patients, as a whole, showed a relatively small percentage of neurotic traits in childhood. However, as adults a majority showed compulsive obsessive traits, as revealed by the civilian history, especially in regard to undue cleanliness, orderliness and neatness. A good many were not too amenable to military discipline, but on the whole the group adjusted fairly well to military life.

The patients' environment, prior to the onset of symptoms or diagnosis of pulmonary tuberculosis, showed that forty-eight were in active combat. The entire group which were studied suffered the emotional traumata common to the overseas soldier; separation from home, anxiety about the family, battle conditions including unsatisfactory food and/or rest, finally the spectre of loss of life and bodily harm. Thus, their life situation immediately prior to the onset of their illness was one conducive to emotional upheaval.

The immediate reaction of the patients upon learning that they had pulmonary tuberculosis indicated a great variety of responses. These appeared in no way dissimilar to a civilian group of tuberculosis patients. The reactions varied from complete acceptance to absolute inability to accept such diagnosis. Twenty-five patients either refused to believe or could not accept the evidence of having pulmonary tuberculosis. It can be realized that the rationalization of these twenty-five patients was influenced by certain factors associated with their military life in addition to intellectual and emotional blocking. The association of these factors will be discussed later.

These patients' plans for their future indicated that the majority had given much thought to this problem. Twenty-five wished to return to their former occupations; fifteen had no definite plans; three patients did not intend to work and would most probably seek compensation; fifty-seven had plans for further schooling, entering business or securing better jobs. These patients showed definite optimism in their future.

The average patient was not embittered by entering the army or by his subsequent hospitalization for tuberculosis. Seven patients, for no definite reason, expressed anger at their draft boards for inducting them. Fifteen were dissatisfied with their induction examination and insisted that, from their point of view, the ex-

amination was not properly performed. Eighty of the patients were quite satisfied with their medical treatment. The remaining twenty were variously dissatisfied with their medical discipline for such reasons as being a long distance from home, receiving insufficient personal attention and the necessity of taking long periods of complete bed rest.

The reaction of these patients to their military service prior to their hospitalization again showed a variety of responses. Twenty-nine showed dissatisfaction which manifested itself in the usual form of army "gripes." Since a reasonable degree of discipline must be maintained in army hospital patients, their complaints were no different from any other group of soldiers. It is worthy of note that an evaluation cannot be made of these particular reactions with respect to tuberculosis.

There were twelve cases which showed associated neuropsychiatric conditions; six had psychoneurosis; one had a battle reaction; two were considered psychopathic personalities; one had a psychosis not due to the pulmonary tuberculosis; one had migraine and one complained of objective vertigo, cause unknown. Therefore, these patients showed a relatively small incidence of associated neuropsychiatric disorders.

Comment: In getting information from patients as Stewart³ showed, a physician must not believe the patients' whole story, but must hunt for what he needs, sifting the essential from the mass of fiction and extraneous information. It is also known that the personal relationship between the patient and the physician is important in determining the truth of the facts obtained in the information. In our hospital we consider that the patient-physician rapport is good, and thus the information obtained through direct interview by the neuropsychiatrist is valid. We have considered the patient's reaction to himself, to his personality, to his family, to his school and vocation, to his illness, to the military service and to his plans for the future. We have attempted a fusion of the mechanistic and biological etiology of this disease coupled with the principles of psychosomatic thinking.

At the time of induction or enlistment all of these patients had normal chest x-ray films. Moreover they were in such physical condition that they were able to complete a period of intensive basic training. All of them were in combat areas before becoming clinically ill. It is not possible by the method employed in this study to evaluate the problem of army life in relation to the question of resistance to infection. These men were exposed to emotional traumata but from the data it did not influence the personality pattern.

The health, economic and social background of these patients

and their families prepared them to make fairly normal responses to their subsequent environment. This was shown with respect to school, vocation and sex. One trend which might not be expected in patients with the above background was an increased tendency as civilians to indulge in alcohol. This was not to a degree sufficient to interfere with their successful economic, social and sexual adjustment previous to entering the army. The evidence of a larger percentage of disciplinary difficulties as shown by minor arrests may not be the direct result of excessive drinking, but in the majority of instances a conflict with the law occurred during alcoholic intake. As mentioned before, any trend to alcoholism was evidenced only as a periodic episode with no potential or actual chronicity. The analysis of the neurotic traits of these patients indicated in our opinion an average incidence of the usual childhood manifestations. There was in civilian life, however, an abnormal incidence of compulsive behavior in relation to undue cleanliness, orderliness and neatness. These socially approved behaviorisms may be considered as a significant factor associated with a good general background. We consider this group to have been as civilians efficient, independent, well adjusted persons. It is possible that a group of this makeup would be expected to make as good an adjustment to military life as they had to civilian life. Training and combat conditions gave rise to a low incidence of neuropsychiatric disorders and to minor disciplinary infractions.

From our data we believe that a psychosomatic formulation can be made of the hundred cases of pulmonary tuberculosis which we have studied. Halliday⁴ has described in detail such formulation for duodenal ulcer, hypertension, rheumatoid arthritis, exophthalmic goitre, fibrositis, asthma, mucous colitis, and chorea. By employing his method of the psychosomatic formula we have found the following data:

1. *Emotion*: We cannot state that the upsetting influence of normal life due to army conditions in war time and in combat duty played any significant role in these cases.

2. *Personality*: These patients showed independence and efficiency which made them normally or better than normally adjusted in their economic, sexual and social spheres. They showed some resentment toward authority. They showed obsessive and compulsive characteristics and were optimistic individuals.

3. *Sex*: All the patients studied were male.

4. *Associated neuropsychiatric affections*: These were considered unimportant.

5. *Family history of psychosomatic illness*: This was negligible.

The characteristics of these patients as described above appear to have a bearing upon their reaction to their tuberculous disease.

We must bear in mind that these patients during their army experience previous to hospitalization for tuberculosis were healthy. They had been examined upon entrance into the army, had opportunity for medical attention throughout training and preparation for combat, and were considered well when they left this country. This period of apparently good health established a conscious basis for rationalization. The reaction to their tuberculous disease was determined by their unconscious mental mechanisms plus the reality situation. In this group, their civilian and military life reactions indicated an efficient and independent pattern. They reacted to their new situation, that is, tuberculosis, in the same manner. Twenty-five of the patients in order to maintain their reaction of efficiency and independence to reality situations, responded to their tuberculosis illness by refusing to accept the diagnosis. These patients employed their former good health as the dominant basis for their rationalization. The remaining seventy-five patients accepted the nature of their illness. However, they still reacted to their illness through their personality pattern of efficiency and independence. This reaction was an optimistic attitude toward their illness and their future.

The employment of the educational adjuncts to medical and surgical therapy in the past has not been directed toward a well defined goal. From the data of this small series we believe that these adjuncts should be directed actively toward maintaining the principal personality reaction of the patient. By proper direction they can help to develop a more mature independence and efficiency which these patients had when they were healthy. In view of this concept a program was established in this hospital to enlarge the scope of the therapeutic approach. This was done through an individual and group education program in each ward, and was aided by an active library service, correspondence courses for high school and college credit, instruction in arts and crafts, directed Red Cross activity and occupational therapy. It included lectures by medical officers and open forum discussions with the medical and the other hospital personnel. (This program will be reported at a later date). By means of this program the patient is enabled to express his aggressive drives during his period of illness and toward constructive planning for the future—with the main emphasis of eventually assuming his former or some other useful status in his community. Since the period of observation of tuberculosis patients in an army hospital is shorter than in a non-military hospital,* it would be of value to make a similar study on patients later in the course of the disease.

*Over ninety per cent of these patients are transferred from this hospital to a Veterans' Hospital for further care.

CONCLUSIONS

1. A psychosomatic study of one hundred army patients with pulmonary tuberculosis was made.
2. This study was conducted early in the course of pulmonary tuberculosis.
3. In these patients there are indications of a characteristic personality pattern.
4. The characteristic personality pattern found was used as the basis for an educational, occupational and recreational program.
5. It would appear to be important that further psychosomatic studies be made early and late in the course of pulmonary tuberculosis.

We are indebted to Colonel Franklin G. Ebaugh, MC, former neuropsychiatric consultant of the Eighth Service Command, who suggested this study.

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CONCLUSIONES

1. Se llevó a cabo un estudio psicossomático entre cien miembros del ejército, hospitalizados por tuberculosis pulmonar.
2. Se realizó este estudio en el período precoz de la evolución de la tuberculosis pulmonar.
3. En estos pacientes hubo indicaciones de un patrón de personalidad característico.
4. El patrón de personalidad característico que se descubrió fue usado como base de un programa para educación, ocupación y recreo.
5. Parece importante que se lleven a cabo estudios psicossomáticos adicionales, tanto en el período temprano de la tuberculosis pulmonar como en el avanzado.

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Oxidase and Tuberculosis

Physiopathologic Meaning and Possibilities for the Diagnosis of Infections by Acid-Fast Bacilli* (Preliminary Report)

PAULO SEABRA, Pharm.D.**

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The present paper is the consequence of old and uninterrupted research work. As early as in 1922, Belmiro Valverde submitted to the Academy my investigations on problems from the lepra field and at the same meeting, Dr. Artidonio Pamplona made a similar communication on my research on tuberculosis, to which Sir Leonard Rogers referred some years later.¹

At the same time, my teacher Orlando Rangel who foresaw the important role played by oxidase in biology, had already suggested that I investigate oxidase. As stated in a previous communication² I succeeded in extracting that enzyme satisfactorily from the cerebral pulp, in 1927.

In 1930 professor Pereira Filho of Porto Alegre, succeeded in cicatrizing chancres and turning negative the Wassermann and Kahn tests, experimentally, in inoculated rabbits with the aid of an oxidasic liquid I had sent him for this purpose. The same liquid also was used by Genival Londres and Arminio Fraga with equally favorable results.

However, these therapeutic tests were not continued, for I preferred first of all to enlarge the knowledge on the physiopathology of oxidase. With this in mind, I presented, in 1938, to the Academy a method for the evaluation of leucocytic oxidase.³ According to Fliessinger,⁴ such a method was missing and Downey considered my method as a "new advance in hematology". Several papers based on this method have since been rewarded with prizes by this Academy.^{5,6,7,8,9,10,11}

A new step was then done by discovering that leucocytic oxidase does not exist in the white blood cells only, what was the general belief until then: on the contrary, the leucocytes, transmit their oxidase in a physiologic rythm to the erythrocytes by what I designated "oxidasic effusion".² Like all physiologic processes, this one has also its disturbances. So, I first studied the hypereffusions of oxidase and their serious consequences, especially for aviators. This subject was discussed in previous papers.^{2,12}

*Paper read at the November 29, 1945 meeting of the National Academy of Medicine, Rio de Janeiro, Brazil.

**Fellow, National Academy of Medicine, Rio de Janeiro, Brazil.

Today, I will give you the results of my first observations on the hypoeffusion of oxidase.

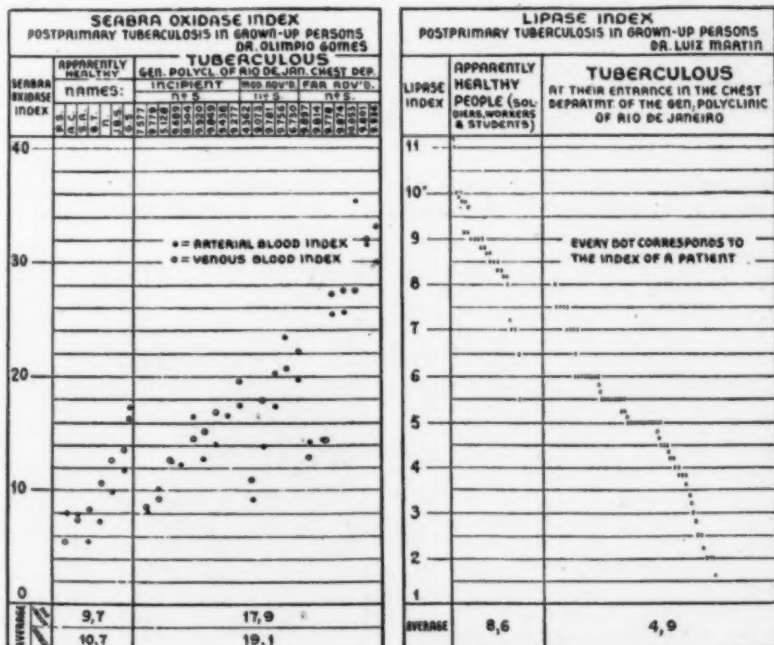
You will remember that Olimpio Gomes, of the MacDowell school, demonstrated with the aid of my method, in a paper rewarded by a prize by you¹¹ that leucocytic oxidase increases with the gravity of tuberculosis. This can be seen on Graph 1 that I made out based on the data given by Gomes.

Physiopathologic Meaning

At first, this did not at all seem logical to me, because, if it is true that in the leucocytes the oxidase is part of the defense mechanism against tuberculosis, the contrary should occur: the oxidase tax should be high in normal individuals and low in sick persons.

This is indeed true for another enzyme, the lipase, according to medical literature published all over the world; one of these papers is that by Dr. Luis S. Martin,¹³ also of the MacDowell school, whose results too are seen on Graph 1.

The present knowledge on oxidase effusion gives way to the hypothesis that in tuberculous organisms some element causes difficulty to the bursting of the neutrophilic granulations that provide the erythrocytes with the "respiratory enzyme," so that the oxidase remains accumulated in the leucocytes. It had, therefore, to be discovered what an element it is. We have already seen



Graph 1

that lipase exists in the plasma with a normal tax and that its function is to split lipidic acid-fast substances, like the capsule that protects the Koch bacillus. The very existence of such a membrane surrounding the bacillus was doubted by several workers, including Fethke in his recent paper,¹⁴ but was definitely confirmed by the electron microscope.¹⁵

If we admit that the lipase also digests the surrounding membrane of the granulocytic granulations, we will understand that in the tuberculous organism oxidase increases in the leucocyte while lipase decreases in the serum.

A. P. Seabra objected that, in order to give this hypothesis a base, it had to be proved that the neutrophilic granulations too are acid-fast. This proof was easy to carry out with the aid of the Ziehl method, slightly modified.* On the microphotograph on Fig. 1 only the granulations of the neutrophils are visible because they resisted to the acid alcohol that decolorized the respective nuclei and other cells.

According to modern knowledge as exposed by Middlebrook,¹⁶ lipase is decreased in the tuberculous organism because the Koch bacillus, if virulent, is secreting a substance which inactivates lipase. The substance already has been perceived by Calmette,

*The slides were fixed by exposure to formol atmosphere during 10 minutes and decolorized, through absolute alcohol with 0.5 per cent nitric acid.

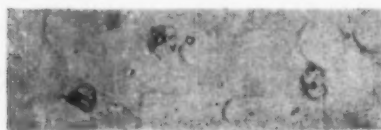


Figure 1



Figure 2

The nucleus of the neutrophils and the erythrocytes were decolorized by acid alcohol, only the granulations of the neutrophils resisted.

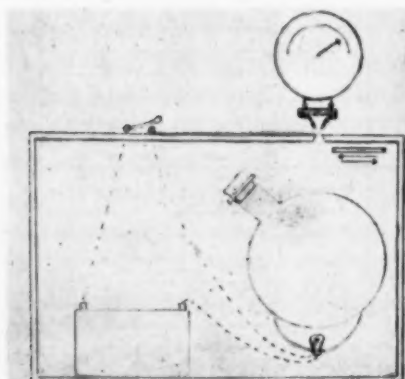


Figure 3

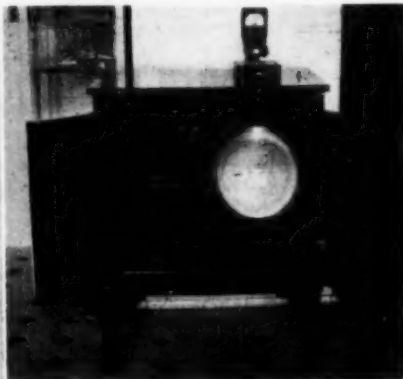


Figure 4

who called it "antilecithinase"; nowadays, it is called "factor P". For this reason, whenever the organism loses the element whose presence turns the bacillus vulnerable, its erythrocytes get poorer of oxidase.

With the purpose of trying out the value of this hypothesis, I was looking for a method that would allow the evaluation of oxidase in the erythrocytes, and I believe I finally found such a method: it is based on the same principle adopted for evaluation of leucocytic oxidase, described in previous papers,³ only varying the concentration of the staining substance—gentian violet—and some other details.* The staining substance is brought into contact with the whole slide, while the mordant with alpha-naphtol reaches only half the smear, so that part of it remains more or less stained, compared with the other half that had not received any mordant; this difference of color is proportional to the contents of erythrocytic oxidase (see Fig. 2).

The difference in staining gets intensified according to the temperature in which the slide is exposed to the mordant, up to a maximum of 75° C; from there on it gets rapidly weaker, until being practically 0 at 100° C. This circumstance confirms the enzymatic character of the phenomenon.**

In order to evaluate numerically the difference of staining char-

*The slides must be quite clean. (a) On the day after preparing the smears, fix them in formol atmosphere for 4 min. and then immediately place them in mordant at 75° C for 30 min., taking care to wet only their lower half. Mordant and container must be placed beforehand in the stove (75° C) for at least 15 min. Siphone the mordant so that the container gets as dry as possible. Wait 20 min. until the smears are dry. Displace the drawer with the slides so that the part treated with mordant gets on top. Put them in the ammoniated gentian container (b) that remains in the 37° C stove for 4 hours. Gentian and the respective container must beforehand remain in the 37° C stove for 15 min. Siphone the gentian and read the smears when they are dry.

(a) The slides must be rubbed with a wet cloth in fine sapol and washed in running tap water and remain for one day in sulphochromic mixture. On the following day, wash them in tap water and then in distilled water; dry with a cloth washed in white soap.

(b) Ammoniated gentian (0.002%) is obtained ex-tempore through dilution of 1 cc. Loele-Seabra gentian in 200 cc. distilled water to which 0.22 cc. ammonia is added.

**Since there has been expressed some doubt about this "enzymatic nature," and the present paper is not read before biologists only, I may be allowed to quote the authorities on the matter:

Carl Oppenheimer: "A singular case is that of papain which at 85° C provokes a very efficient splitting of albumen, but which is then rapidly destroyed. . . . The 'deadly temperature' is as varied as is the 'optimum temperature': for trypsin already at 30° C a serious damage is noted, while several oxidases bear boiling temperature for some time, as well as several bacterial proteases. . . ." (*Die Fermente und ihre Wirkungen*, 5th ed., Leipzig, 1925, Vol. I, p. 59).

Pierre Thomas: "It is generally admitted that the enzymes in aqueous solution are inactivated by heating to 100° C and that this destruction may be considered as a criterion for enzymatic action, for non-enzymatic katalyzers always resist to this temperature." (*Manuel de Biochimie*, Paris, 1936, p. 195).

acteristic for erythrocytic oxidase, I built an electrophotometer (Fig. 3 and 4) where a battery is connected with a lamp whose light is cooled and condensed in an orifice of 3 m. diameter and then caught by the photoelectric cell connected with the galvanometer whose maximum is 200 microamperes.*

The part of the smear that had not been treated with mordant is placed in the photometer and the light is regulated with the diaphragm so that the microamperimeter remains at 200 MA. Then the smear is displaced transversally so that the light falls on the other part of the smear—the one that had been treated with mordant—and since this is darker, it marks less, say 150. In this case, the erythrocytic oxidase indicated by the microamperes is 50.

The smear must be of a medium thickness. Variations, however, if they correspond to both sides, will not greatly modify the results of the test. On every part of the smear the maximum (200 MA) is fixed over its clearest spot and then the difference is read over its darkest spot, except for the smear's edge where mistakes are possible. It is suggested to take the values of, say, three different parts of the smear and register their average.

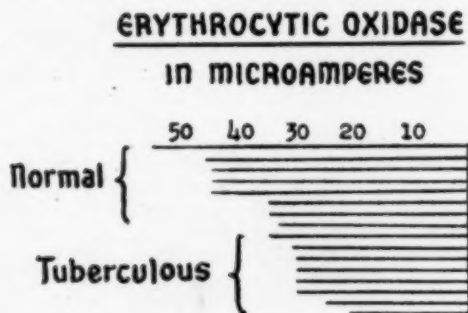
The results observed are condensed on Graph 2 and show the reduction of erythrocytic oxidase in tuberculous organisms.

This means that the bacillus, when throwing into the blood stream the substance by which itself is protected, leaves at once the red cells of the tuberculous organism poor of oxidase, which remains stored up in the granulations of the neutrophils which too are acid-fast.

Diagnostic Possibilities

Now, after many progressive experiments, I requested from Dr. Olimpio Gomes 12 smears (dated August 24, 1945) corresponding

*I did not and shall not claim any proprietary rights on this device. On the contrary, I am glad to inform that several firms already are planning to build such devices in improved form and reduced size.



Graph 2

to various individuals. I submitted these smears to the staining process as described above and then divided them into two groups, according to their respective results: normal and tuberculous. There was disagreement in two cases: one that I had placed among the normal ones was given by Gomes as tuberculous, though in much better condition than the remaining; the second mistake concerned a case whose findings appeared to belong to a tuberculous patient but who had been classified as normal by Gomes. This referred to a fat woman with very pale complexion who on my request was examined, then, and found to have erythrocytic sedimentation rate 40 mm. in 2 hours (Westergreen), opacity in one costodiaphragmatic sinus and a past pleurisy, Mantoux strongly positive, phlyctenular.

A month later, I asked Gomes for new blood smears. Three of them were easily recognized by me as normal and three others were tuberculous. About the remaining two I was doubtful and these happened to be the same tuberculous person as before, on the way of being cured, and that woman who was apparently normal.

The same day I collected blood samples of eight individuals apparently in the best of health among the laboratory workers. One of the girls called my attention by her low erythrocytic oxidase (33.5 MA) and referred indeed to a person having recently had a serious cold and lost 4 kg. of body weight; she was already being treated specifically and was now told to stop working and brought to the care of a chest physician. Another test corresponding to a young man who had completely recovered from tuberculosis years ago, with pneumothorax, now working, showed the maximum for normal individuals (60 MA) (see Fig. 5).

On September 28, at a private meeting of physicians in the laboratory, several smears were read in the photometer, 3 of which

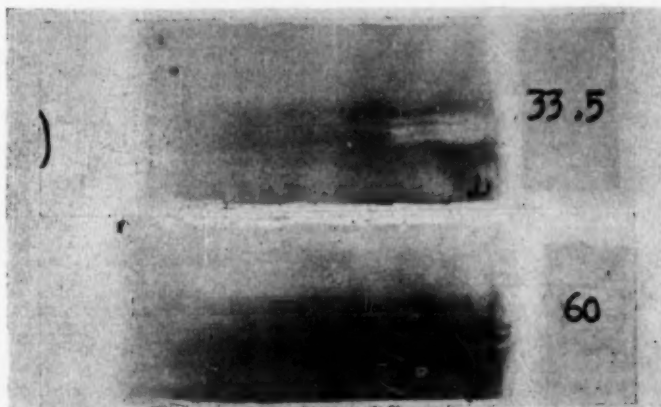


Figure 5

from normal and 3 from tuberculous subjects. The results were in complete agreement with this.

I also requested blood smears from Dr. Alvaro Vieira, from normal and tuberculous maternity patients of St. Sebastian's Hospital of this city. One tuberculous patient in good condition gave a result on the limit of normality (41 MA); two others were correctly interpreted by me as tuberculous and two as normal, one of the latter being a completely recovered and working tuberculous nurse.

In order to discover whether or not the loss of erythrocytic oxidase has any connection with the anoxemic condition, I asked Prof. MacDowell for blood samples from cases of asphyxial pneumonia and violent asthma. I obtained samples in two asthma cases. In both, the exact contrary to tuberculosis was found: high oxidase content, in one of the cases even the highest index found until now (78 MA).

It would also be interesting to carry out the photo-oxidasic test in other diseases due to acid-fast bacilli, like leprosy. It has been known for years¹⁷ that this affection provokes a decrease of the lipase index similar to tuberculosis, and nowadays it has been confirmed that erythrocytic oxidase also is low in leprosy. This test was carried out with blood smears from lepra patients of the Hospital dos Lazaros, thanks to the kindness of Dr. Petrarca de Mesquita.

Encouraged by these results, I built some devices with the purpose of taking the blood of the whole personal in schools, plants, etc., and of allowing sure identification of every smear, in order to enable general surveys (Figs. 6 and 7).

The first 116 results are condensed in Graph 3, twelve of which refer to tuberculous subjects previously diagnosed, 8 to leprous

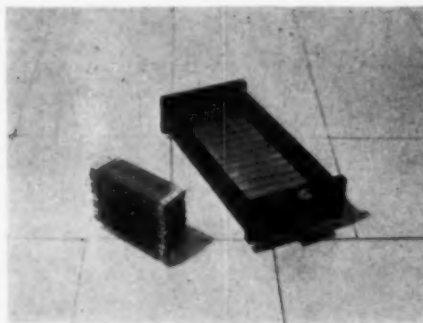


Figure 6

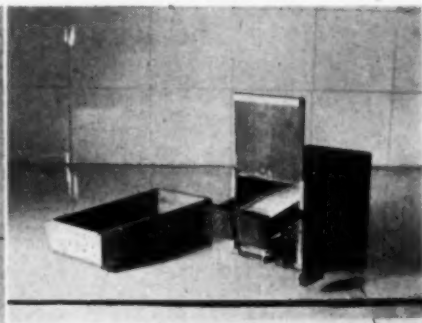
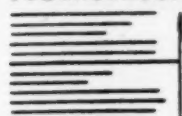
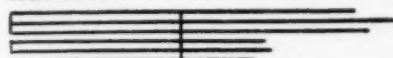
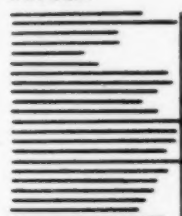
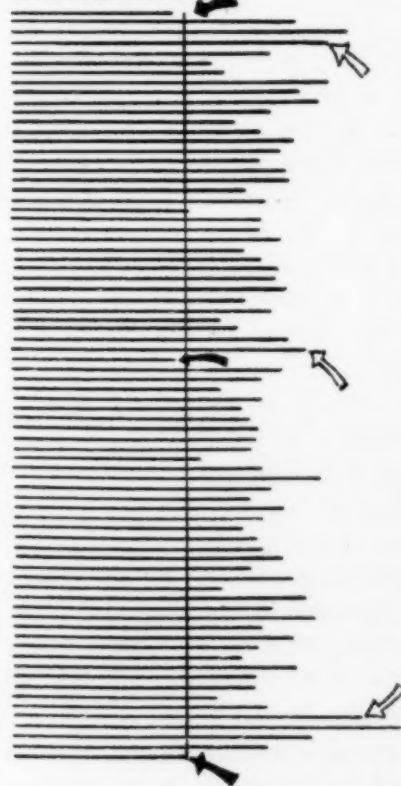


Figure 7

Fig. 6: The blood drops taken in schools, plants, etc., are brought on the slides which immediately are placed in the ebonite drawer.—*Fig. 7:* On the following day the drawer is exposed to formol atmosphere and placed in the container with the respective reagents. After this, the slides are identified by labelling and are then read in the electrophotometer.

SEABRA'S PHOTO-OXIDASE TEST**MICROAMPERES**

5 15 25 35 45 55 65 75

TUBERCULOSIS**ASTHMA****LEPRO****GENERAL SURVEY**

Graph 3

patients in the same condition, 2 to asthmatic persons and 76 to apparently normal workers. Among these, those marked by a white arrow refer to recovered tuberculous persons and those marked by a black arrow to individuals whose normality was contested by the test and later on also by other examinations.

There is still much to be done, such as checking this test in other pathologic conditions, establishing the eventual relationship between the number of microamperes and the progress of the disease (tuberculosis). I am at present working on a general survey simultaneous with photo-oxidase test, tuberculin test and abreugraphy (photofluorography).

As you see, the matter is still in the beginning. By now, it is possible to give the following:

Conclusion: The virulent acid-fast bacillus reduces the erythrocytic oxidase of the host, so that new diagnostic possibilities arise.

COMMENTS

Dr. Manoel de Abreu: Since we deal with a "Preliminary Note," there is nothing to be said definitely on the subject yet. I only wish to congratulate our colleague Paulo Seabra, who really is a restless, creative mind and who, not only in pharmacy but in medicine as well, has already created new techniques with great meaning. I should like, therefore, to prove the high esteem, the sympathy and admiration I feel for him, for I am sure that his investigations are of great interest.

His research work indicates a new way if not for the diagnosis for tuberculosis, in any case in the very important point of the study of the activity of tuberculous lesions.

Dr. MacDowell: I too will not discuss, Honorable President. Dr. Abreu is quite right to say that a work of that kind must not be discussed. It is a practical experimental work and profound as to its performance. All the works by Paulo Seabra go through a criterion of self-criticism which is sometimes even exaggerated.

I wish to deal only with the clinical side of this work, because this is not part of the author's responsibility. This is our part, the part of clinical workers and we have, indeed, the only intention of cooperating with Paulo Seabra, besides in our own interest.

The asthma cases quoted are quite eloquent: essential bronchial asthma cases, where all the investigations for tuberculosis had remained negative. From the scientific point of view, particularly, the works by Seabra are quite connected with clinical work and their verification is submitted to equally rigorous tests in the laboratory.

On one hand, we have the investigations by Manuel de Abreu, the leading specialist, with their enormous prospects known by all of us, on the other hand, there is the contribution given today by Seabra which is really remarkable, for it is increasing the meaning of the investigations made until now in this particular field which turned principally around the activities of the disease. The works by Seabra are not meant in the sense of the evolution of the activity of the disease, like those by the French workers Besancon and others, but much more in the sense of the activity of the very bacillus. The disease, properly speaking, may be out of activity, and no toxemic condition is made clinically evident by the findings of sedimentation rate, fever, general condition, nor by any other phenomenon.

It seems to me that this activity of the bacillus always will, as it always did, escape clinical observation, if no laboratory work comes to complete it, for it is impossible to ascertain the diagnosis of bacillar activity until there exists no lesion, neither in the radiological nor in the clinical sense. The physiopathology of tuberculosis in connection with its diagnosis, especially in precocious cases, shows the intrinsic importance of Seabra's investigations that already reached a point beyond radiology. Manuel de Abreu knows better than anybody else that, in spite of its valuable importance, there are always cases where radiography is of no help.

Now comes Paulo Seabra and brings us a means which we may call mathematical. It seems as if medicine turns to be mathematics, and we ourselves don't want to be mathematicians in front

of so many unknowns. As a matter of fact, Seabra tells us that whenever his microamperimeter shows under 35, the respective individual is either tuberculous or, at least, suspicious of tuberculosis. And suppose the same individual goes to consult a physician, he would auscultate him and hear nothing. Poor physicians we are!

It may be useful to state that I am a physician from the time of percussion and auscultation and that I still cling to these means of diagnosis, because in my opinion sometimes radiography may not give us the necessary security; this occurs when the condensations are not strong enough to intercept x-rays, give no dark spots, being, therefore, without significance.

Finally, biochemistry and the still more positive biophysics come and tell us: there is something abnormal in this individual!

Unfortunately, much carelessness still occurs in the matter. Many times we get acquainted with cases that are greatly advanced. We have to make conscientious and careful examinations in order to catch the disease in the beginning, thus cooperating efficiently in the program of social medicine whose usefulness is obvious. We are part of this secular house of Medicine, whose priesthood none of us would ever give up, in spite of all the socialization of our times.

I should like to emphasize before you the enthusiasm I am feeling for the wonderful work by my friend Seabra.

SUMMARY

The author observed that in tuberculosis leucocytic oxidase increases proportionally to the advance of the disease, which is contrary to what happens with serolipase. This might be due to the fact that the surrounding membrane of the granulations of the neutrophil be composed similarly to the acid-fast capsule of the Koch bacillus, whose membrane, being lipidic, is destroyed by lipase. This hypothesis was confirmed by the Ziehl method after its special adaption to the case. The substance surrounding the granulations of the neutrophil is, therefore, acid-fast.

The author then recalls the prevailing conception as exposed by Middlebrook: in tuberculosis, the lipase decreases because the Koch bacillus, if virulent, produces a neutralizing substance, formerly called "antilecithinase" by Calmette and now known as "factor P".

Since the capsule of the oxidasic granulations gets stronger in tuberculosis, the normal oxidasic effusion from the neutrophil toward the red corpuscles gets reduced to hypoeffusion.

It has been possible to demonstrate this fact, thanks to the creation of an electro-photometric method for the evaluation of erythrocytic oxidase which, indeed, appears to be reduced in the pathologic conditions due to acid-fast bacilli (tuberculosis and leprosy).

RESUMO

Verificou o autor que a oxidase leucocítica sobe na tuberculose, em relação com a gravidade, ao contrário do que acontece com a serolipase. Tal fato poderia ser explicado se o envoltório das granulacões do neutrófilo fôsse de composição semelhante ao envoltório que confere acido-resistência ao bacilo de Koch, o qual, por ser lipídico, é lisado pela lipase. A hipótese foi confirmada, mediante o método de Ziehl, especialmente adaptado. O envoltório das granulacões do neutrófilo é, pois, ácido-resistente.

São, a seguir, mencionados os conhecimentos expostos por Middlebrook, de que, na tuberculose, a lipase baixa porque o bacilo de Koch, quando virulento, produz uma substância neutralizadora, que Calmette chamava "antilecitinase" e hoje é conhecida como "Factor P".

Como o envoltório das granulacões oxidásicas fica mais resistente na tuberculose, estas se rompem menos, isto é, a efusão oxidásica normal, do neutrófilo para o eritrocito, fica reduzida a hipo-efusão.

Este fato pôde ser demonstrado, graças á criação de um método electro-fotométrico para estimar a oxidase eritrocítica que, realmente, se apresenta reduzida nos estados patológicos devidos a germes ácido-resistentes (tuberculose e lepra).

Rua Ferreira Pontes, 148.

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Primary Endothelioma of the Pleura*

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Legion, Texas

Primary endothelioma of the pleura is a very rare and a very controversial neoplasm. The controversy rages over nomenclature, types, origin, histology and its very existence. It is not the purpose of this study to dare enter into the controversy. In presenting our two cases which were admitted at Legion Hospital within three months and which are diagnosed as primary endothelioma of the pleura on the basis of generally accepted clinical, roentgenological and necropsy findings, we rather aim to point out the clinical and laboratory findings which may help in establishing an early diagnosis. An early diagnosis saves the patient a great deal of ineffectual therapy.

Historical and Statistical Data: The first two cases of endothelioma of the pleura reported in the American medical literature were those of Biggs, which were presented before the New York Pathological Society in 1890.

In Europe it was Wagner,¹ who in 1870 was the first to recognize the tumor as a pathological entity and has described it as a "tubercle-like lymphadenoma."

Patterson² reported 96 cases in the literature up to 1909 while Rosenbaum³ reported only 60 cases up to 1914 of fairly well established primary tumor of the pleura although the latter does not indicate that all of them are endotheliomas.

Banyai⁴ states that only 40 to 50 authentic cases of endotheliomas are reported in the literature up to 1925.

Out of 345,000 admissions at the Ford Hospital, Detroit, Michigan, only 3 cases were identified as endotheliomas of the pleura.

Clarkson⁵ reports 2 cases in 10,000 necropsies at the Pathological Institute of Munich, Germany.

Keilty⁶ reports 9 cases in 5,000 necropsies in the records of the McManus Laboratory of Pathology of the University of Pennsylvania.

Saccione and Coblenz⁷ in their excellent study of the subject state that the average frequency of the neoplasm is 0.1 per cent or 1.1 cases per thousand necropsies.

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Incidence and Age: The tumor occurs chiefly in adults, is more frequent in males, at the ratio of two to one, and is more prevalent on the right side of the chest.

Origin of the Tumor: Ewing,⁸ in reviewing the opinion of numerous authors, states that Wagner, Volkmann and others believed that the endothelioma has usually been referred to the cells of the subpleural lymph spaces which have been affected in the early states; that Bender and Curmann were able to trace the tumor to the lining cells of the pleura, which several observers have found to show nodular thickening due to proliferating endothelial plates, while Rossen, Palemot and others were unable to trace the origin exactly. All agree, according to Ewing,⁸ that the process begins over a wide area. It is possible, he states, that two groups of tumors of the serous endothelium should be recognized: one—invasive; the other—superficial, nodular or pappillary and originating from the lining cells. Robinson⁹ contends that the so-called endothelioma of the pleura is really secondary metastasis from unrecognized or latent primary carcinoma of the lung or bronchi.

Lord¹⁰ states that the character and histological appearance of the pleural endothelioma does not in general differ from carcinomas of other regions and he thinks that for this reason their origin in the surface epithelium or lymph vessel endothelium is too uncertain, and the term carcinoma instead of endothelioma of the pleura is more appropriate for these tumors.

Boyd¹¹ divides the primary tumors of the pleura into localized and diffuse, and states: "The former constitute a group, while the latter, a distinct entity." He agrees with the authors who believe that many tumors are really secondary to a bronchogenic carcinoma. When these have been excluded, there remain, he states, the endotheliomas of the subserous lymphatics. They are true tumors of the cells lining the membrane. The lining of the pleuro-pericardial cavity developed from the celomic epithelium which is formed by the splitting of the mesoderm and is mesothelial in nature, with the power of developing tumors which may present both epithelial and mesenchymal characters. "In view of the fact that these mesotheliomas arise from the surface lining, it is natural that they should spread widely, so that diffuseness is the most striking gross feature" (Boyd).

Clinical Picture: Idiopathic pleural effusion after middle age may be the chief complaint and first clinical manifestation of a pleuro-pulmonary malignant tumor. The onset is usually gradual and may become apparent following influenza or an upper respiratory infection. Pain in the chest appears early and is intermittent in the beginning. It is not relieved by fluid formation. It gradually becomes constant and gnawing, and is not usually affected by

respiration or cough. It is first situated in the axilla and it is felt in the chest wall itself. It spreads to a wide field and it is felt in an area which is anaesthetic to external stimuli. Barret and Elkington¹² believe that the pain is due rather to the involvement of the intercostal nerves than of the pleura itself.

As the disease progresses and in accordance with its stage, the symptoms become accentuated. The dyspnea and the dry, irritating cough which are only slight in the beginning, increase markedly and at the last stage, the patient presents a picture of a far advanced cardiac or phthisic. Peculiarly, no relief from pain or dyspnea is obtained by repeated aspirations, a phenomenon which is not easily explained. The fluid reforms usually after aspirations. The physical findings are those of a pleural effusion. The affected hemithorax is immobilized and is bulging due to the progressive expansion of the neoplastic growth. However, the intercostal spaces are frequently retracted and narrowed due, most likely, to the wasting and complete paralysis of the intercostal muscles on the affected side. There is also often wasting and paralysis of the upper segment of the abdominal recti and oblique muscles, which may be responsible in part for vague gastrointestinal symptomatology. The diaphragm on the affected side is immobilized and frequently depressed. There is dullness to flatness on percussion with occasionally a peculiar sensation of solid resistance not found over large effusions (Banyai). The mediastinum may or may not be shifted to the contralateral side. On aspiration, the needle encounters great resistance on passing through the pleura, a point of great importance in the differential diagnosis. There are numerous less common signs, such as clubbing of the fingers, unilateral or bilateral vocal paralysis, dilatation of the thoracic veins, etc. The disease is of short duration, usually from six to nine months, only rarely over two years, from the time of its recognition. The course is that of progressive cachexia, weakness, increasing dyspnea, cyanosis, coma and death.

Laboratory Findings: The blood picture is that of a secondary anemia and moderate leucocytosis. The sedimentation rate is rapid. Microscopic examination of the fluid does not offer any valuable information. The chest fluid may be serous but is usually serosanguineous or sanguineous.

Post Mortem Findings: Macroscopy: Macroscopic findings, according to Saccione and Coblenz, are as important as the microscopic picture and they believe that a well described necropsy finding conclusively proves the diagnosis, and that when the microscopic examination leaves a doubt, the macroscopic one will usually clinch the diagnosis. The entire pleura on the affected side is replaced partly or wholly by an irregular mould of pinkish

grey hard tissue, cartilage-like in consistency, most often thickest at the base of the lung. The lung is collapsed but almost never invaded either by extension or metastasis although the pleura may be extensively involved (Saccione and Coblenz⁷). The parietal pleura alone may be affected. There might be an extension of the process to the bronchial, axillary, cervical and mediastinal lymph nodes, and liver. The process may extend to the peritoneum, pericardium or to the pleura from the peritoneum (Ewing⁸).

Microscopy: "After reading the microscopic description of these tumors, it would seem that one would be hard put indeed to make the diagnosis on such information alone" (Saccione and Coblenz⁷). Characteristic is the strong dermoplastic reaction responsible for the marked thickening of the pleura. The formed connective tissue is very poor in cells but rich in collagen fibers, thus giving the tumor its grit-like consistency.

The cells have no distinguishing feature and show nothing unusual except perhaps the fact that they are not large and most often rather uniform in size. They are, as a rule, polyhydral, though cylindrical and spindle shaped forms have been found. In the majority of cases of most of the authors, they were typically epithelial in appearance. The cytoplasm is moderate in amount, sometimes abundant, homogeneous and usually acidophilic. The nucleus is large, vesicular, with a distinct nuclear membrane containing one or more easily visible nucleoli. One feature when found is characteristic, i.e., the presence of concentrically layered bodies, not calcified, which appear to be similar to the corpora amylacea of the prostate. They stain blue with hematoxylin-eosin. There is a small tendency to metastasize. If not rare, it is not common. All organs may be invaded but this is an exception and not the rule.

X-Ray Findings: X-ray findings in many cases are most helpful in the diagnosis, although not in the early stages when findings suggestive of pleural reaction with or without fluid are noted. For diagnostic purposes, air should be induced into the pleural cavity after an aspiration. The film then reveals the characteristic multiple smooth tumor nodules of various sizes and thickness, mostly over the parietal pleura, with the lung markedly collapsed in most cases.

CASE REPORTS

Case I: G.L.K. Patient was a white male of 67, a stock farmer. His past and family history is not remarkable. He was admitted to the Veterans Administration, Legion, Texas, on October 21, 1943, from another hospital, where he stayed for seven weeks. His complaints shortly before his first hospitalization were slight dyspnea and precordial pains, slight productive cough and loss of appetite. There was no loss of weight. The temperature was always within normal limits. While in the hospital, he

developed pains in the right chest, his chief complaint from then on. The patient developed an effusion in the right chest and was tapped once. His laboratory work-up including sputum examinations for acid fast bacilli was negative. A diagnosis of pulmonary tuberculosis with pleural effusion was made and the patient was transferred to the Legion Hospital.

On admission here, the patient appeared chronically ill, fairly well nourished. He complained of weakness, dyspnea and slight cough, also pains in the right chest. The chest examinations revealed the presence of an hydropneumothorax on the right with the heart markedly displaced to the left. The liver edge was felt 4 inches below the costal margin. The spleen was not enlarged. The right half of the chest and abdomen was markedly edematous, and dilated veins were noted at the right hemithorax and abdomen. No palpable lymph nodes were found.

Laboratory Findings: Urine, Wasserman: negative. The blood picture showed evidence of a secondary anemia. The sedimentation rate was 27mm/H (Cutler). Two out of five sputum concentrates were positive for acid fast bacilli ten days before his death. An initial diagnosis of pulmonary tuberculosis and possible tumor of the pleura was made. Five chest aspirations with removal of 11,000 cc. of fluid were done; the fluid, amber colored in the beginning, subsequently changed into reddish brown. The aspiration needle encountered marked resistance in passing the pleura.

The x-ray film of the chest, taken on 10/28/43, was reported as indicative of a malignancy either of the pleura or metastatic to the right lung; hydropneumothorax right.

The patient was failing gradually. However, at no time, except on his last day, was the temperature abnormal. The chest pains were gradually increasing in severity, as well as the dyspnea. The aspirations did not bring any relief. Shortly before his death, the patient became irrational and he expired on 11/16/43.

Necropsy Report: The right pleural cavity was full of slightly hemorrhagic fluid. The parietal surface was markedly thickened and filled with tumor tissue from apex to base and over the diaphragm. The mediastinal surface of the right pleura was also involved. There was a scalloping of the tumor mass, making the thickness variable at different levels. The tumor was soft, gelatinous, gray-yellowish white in color. No hemorrhage, or apparent necroses were noted. The right lung was completely collapsed toward the hilum and the same tumor tissue covered the visceral surface of the pleura, and as one cut through the visceral pleura and lung, a sharp demarcation between the tumor and the lung parenchyma was found, varying in thickness at different levels. The entire lung was collapsed and atelectatic. The peribronchial lymph nodes in this area were infiltrated with tumor tissue. The bronchial tree seemed to be free of malignancy. The heart and pericardial cavity were normal. There was no evidence of tuberculosis or malignancy in the lung proper. There was free fluid in the abdomen. The liver was greatly enlarged. Many tumor masses were seen below the diaphragm on the right. There was no evidence of malignancy in the liver, no cirrhosis or hepatitis. Tumor masses similar to those of the pleura were found around the right adrenal gland. The left side was free of this condition.

Histology: Microscopic examination of the tumor tissues showed numerous clusters of polyhydral cells, possessing small hyperchromatic nuclei.

There was a considerable pleomorphism with a good deal of variation in size, and shape of the cells. Mitosis was present; some were atypical. The stroma was dense in consistency and showed hyaline degeneration. The tumor cells showed marked invasive properties. There was considerable necrosis and hemorrhage throughout the tumor tissue which involved the stroma as well. In places, the cells were arranged in solid masses and cords. No histological changes of significance were noted in the liver, spleen, kidneys and adrenals.

Diagnosis: Malignant endothelioma, right pleura, with extension to the diaphragm and retroperitoneal tissues surrounding the celiac axis.

Case II: L.E.C. The patient was a 54 year old white male, admitted to the Veterans Administration, Legion, Texas, on July 3, 1943, with complaints of fatigue since March, 1943, and progressively developing cough, expectoration, night sweats, dyspnea and pain in the chest, particularly under the right scapula. He lost 30 pounds in weight in one year and also complained of epigastric pains. The patient appeared very ill and emaciated. Examination revealed a bulging area of the right upper hemithorax posteriorly. The chest mobility was markedly restricted on the right. Flatness on percussion and distant to absent breath sounds on the right upper chest posteriorly on auscultation. No rales were heard. The temperature remained at 99° F. until his death, except for a few days when it had risen to 101° F. Routine laboratory findings were essentially negative. The blood picture revealed secondary anemia. All sputa were negative for acid fast bacilli. X-ray diagnoses of July 3, 1943: "Tumor—right lung."

A biopsy of the tumor was done on 7/9/43. The indurated surface of the tumor was exposed and appeared to be smooth. The microscopic examination revealed numerous clusters of polyhydral and cuboidal cells possessing small hyperchromatic nuclei. There was a very dense connective tissue stromal response. There was an attempted differentiation of the stromal cells toward atypical pleural serosa. Also, there was a



CASE I



CASE II

Fig. I (Case I): G.L.K. "Endothelioma of Pleura." Film taken after removal of fluid from the right chest.—**Fig. II (Case II):** L.E.C. "Endothelioma of Pleura."

considerable pleomorphism with a good deal of variation in size and shape of the cells. There was some atypical mitosis present. The stroma was dense in consistency and shows extensive hyaline degeneration. The picture represented a primary tumor arising apparently from the serosal cells of the pleura. Diagnosis: Primary endothelioma, right pleura.

The patient was failing rapidly. He complained of severe chest pains on the right. There was progressive weakness, cachexia and mental confusion. The patient expired on 7/28/43. No necropsy was performed.

Diagnosis: One should keep in mind the early pains in the chest, mostly in the axilla which are increasing in severity. No relief is obtained from fluid formation or its aspiration. The fluid is most frequently of a sanguineous nature. The temperature is within normal limits. The pleura is thick and very resistant to the aspiration needle. Thoracoscopy and x-ray findings are of the greatest import.

Therapy: Sauerbruch¹³ believed that an operation was of some avail if an early diagnosis is made. Deep x-ray therapy is ineffectual. Symptomatic therapy is the only one indicated.

Differential Diagnosis: In pulmonary tuberculosis, we have mainly the presence of fever with the sputum positive for tubercle bacilli. Hemoptysis is frequent. If a pleural effusion is present, it is rarely of an hemorrhagic nature. Aspiration of the pleural effusion usually relieves the dyspnea and very often the fever. The findings on single or serial x-rays are of great diagnostic value.

In cancer of the lung (primary or metastatic), the chest pains appear usually late in the disease and are usually deep-seated unless the pleura, the chest bones or nerves are affected. Symptoms of pressure and obstruction are present. X-ray findings: The tumor may not be seen but only its effects are noted, such as atelectasis, displacement of the heart, enlarged mediastinal lymph nodes. However, in secondary carcinomas, the tumor is usually seen throughout the lung field. In bronchogenic carcinoma, the cough is persistent and irritating, hemoptysis is frequent. Bronchoscopy, bronchogram and biopsy are of great aid in diagnosis.

SUMMARY AND COMMENT

1. The rarity of the endothelioma of the pleura is noted; historical and statistical data and various theories as to the origin of this controversial neoplasm are presented.

2. Necropsy findings of which the macroscopic ones seem to be of great value, are described.

3. The clinical picture is described with emphasis on the presence of early axillary pain, absence of fever, presence of a pleural effusion, mostly hemorrhagic in nature, dyspnea which is not relieved by fluid formation or aspiration, thickness of the pleura

and its marked resistance to the aspiration needle. The absence of palpable lymph nodes is noteworthy. Vague gastro-intestinal symptoms were found in both of our cases.

4. Two cases are presented, one of which was diagnosed clinically and confirmed by necropsy findings, and another diagnosed on the basis of a biopsy findings.

5. The differential diagnosis with similar diseases is given. In this connection, it is interesting to note the opinion of Ewing,⁸ who believes that in some cases, the endothelioma seems to be connected with pulmonary tuberculosis. Saccione and Coblenz,⁷ whose paper was so frequently quoted here, state that they did not find any tuberculosis in their cases but point out that many authors mention the fact that some patients had either one or several attacks of pleurisy on the involved side and that some of these, of course, may have been of tuberculous origin. It is interesting to note the absence of tuberculous findings in the lungs on necropsy in our case, and the reported acid fast bacilli in the sputum. One should not always accept the presence of acid fast bacilli as the only criterion of the presence of pulmonary tuberculosis.

6. The fatality of the disease and the paucity of therapeutic measures are pointed out.

7. The failure of the aspiration to relieve the dyspnea might be ascribed to the fact that the collapsed lung does not easily re-expand.

RESUMEN Y COMENTARIO

1. Se observa la rareza del endotelioma de la pleura, y se presentan datos históricos y estadísticos y varias teorías acerca del origen de este discutido neoplasma.

2. Se describen los hallazgos autópsicos, entre los cuales los macroscópicos parecen ser de gran valor.

3. Se describe el cuadro clínico, recalcando la presencia de dolor axilar precoz, ausencia de fiebre, presencia de derrame pleural—de naturaleza hemorrágica en su mayor parte,—disnea que no se alivia con la aparición del derrame o la aspiración, engrosamiento de la pleura y su decidida resistencia a la aguja de aspiración. Es notable la ausencia de ganglios linfáticos palpables. En nuestros dos casos se observaron síntomas gastrointestinales vagos.

4. Se presentan dos casos, uno de los cuales fue diagnosticado clínicamente y confirmado por los hallazgos autópsicos, y el otro fue similarmente diagnosticado a base de los hallazgos biópsicos.

5. Se presenta el diagnóstico diferencial de enfermedades semejantes. A propósito de esto, es interesante notar la opinión de Ewing,⁸ quien cree que en algunos casos el endotelioma parece

estar relacionado con tuberculosis pulmonar. Saccione y Coblenz,⁷ cuyo trabajo hemos citado tan frecuentemente aquí, declaran que ellos no encontraron en sus casos tuberculosis alguna, pero agregan que muchos autores mencionan el hecho de que algunos pacientes tuvieron uno o varios ataques de pleuresía en el lado afectado y que, por supuesto, algunos de esos ataques pueden haber sido de origen tuberculoso. Es interesante notar la ausencia de hallazgos autopsícos de tuberculosis en los pulmones en nuestro caso y, también, los bacilos ácido-resistentes que se encontraron en el esputo. No debe uno aceptar siempre la presencia de bacilos ácido-resistentes como prueba de la existencia de tuberculosis pulmonar.

6. Se señalan la fatalidad de la enfermedad y la escasez de medidas terapéuticas.

7. El fracaso de la aspiración en aliviar la disnea puede ser atribuido al hecho de que no se decolapsa fácilmente el pulmón colapsado.

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Tuberculosis in Greece: Present Conditions and Future Considerations

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The problem of tuberculosis in Greece today is indeed one of its most pressing and is at least three to five times more serious now than before the war. In a country where the economic life and health conditions, at best, were never too good by modern standards, the events of the past five years have had disastrous consequences. Persecution, devastation, massacre, privation, hunger, and economic chaos—all these have been the unhappy lot of the Greek people and have caused exhaustion and depletion of their physical reserve, making them increasingly susceptible to the scourge which long has consumed the strength of Greece. Shortage of rural shelter and difficulties of life in the regions has resulted in a mass influx of people into the larger cities with consequent overcrowding and unhealthy living conditions—fertile soil for massive infection. However, despite the tremendous increase in rate, it can safely be said that tuberculosis is not epidemic in Greece today though the potentialities are great and the danger ever present.

A year in Greece with the UNRRA Greece Mission has given the author a chance to observe conditions at first hand. Much of the following facts are drawn from personal observations and from the voluminous reports of his associates, particularly those of the Chief Consultant, Dr. J. B. McDougall, to whom he is deeply indebted.

MORTALITY AND MORBIDITY RATES

The accurate determination of mortality and morbidity rates is difficult due to the unreliability of the official returns. No attempt was made to keep statistics during the period of occupation and the last available figures are for 1938. Even these cannot be interpreted too rigidly for notification of the disease is not compulsory. There is considerable public and professional prejudice against the disease and many returns are deliberately falsified. At least 10 per cent of all deaths are classed as "undefined causes".

Table I shows the official returns from 1934 to 1938 for deaths

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in urban and rural areas of Greece and Table II the geographical divisions and rates.¹ From these it is evident that the rates vary for the various sections of the country, being lowest in the fertile sunny lands of the Peloponnese and Crete and highest in the provinces of the North where industrial and agricultural environment are bad and life more difficult. The rates in the areas with the larger cities are of little value due to the tendency of people with tuberculosis to concentrate in these cities—the only ones with hospital facilities—and the consequent registration of deaths in the institutions as having occurred in these areas and not from the place of origin of the patient.

In any event, whatever the actual tuberculosis mortality rates were prewar they are certainly different now. Little reliance can then be placed on the number of deaths. More modern methods

TABLE I
DEATHS FROM TUBERCULOSIS

YEAR	Rural Areas		Urban Areas		All of Greece	
	Number of Deaths	Rate per 100,000	Number of Deaths	Rate per 100,000	Number of Deaths	Rate per 100,000
1934	4436	97.3	5281	248.0	9717	145.3
1935	4235	91.4	5099	236.1	9334	137.4
1936	4100	87.1	4746	217.7	8846	128.4
1937	4121	86.9	4829	216.4	8950	128.3
1938	3743	77.8	4487	199.3	8230	116.6

TABLE II
DEATHS BY GEOGRAPHICAL DIVISIONS

	Census of 1940	1938	
		Deaths from Tuberculosis	Rate per 100,000
Central Greece	1,783,832	3233	180.8
Peloponnese	752,779	833	70.7
Cyclades	129,199	131	89.5
West Greece	721,621	953	132.1
Thessaly	572,911	464	83.2
Macedonia	1,758,240	2041	122.1
Epirus	468,371	257	71.3
Crete	438,399	288	65.6
Aegean Islands	303,088	259	76.9
Thrace	359,552	419	119.1

of study recently instituted in Greece point the way to a more accurate determination of the problem through a study of incidence rates. It is still too early to quote accurate figures but preliminary study by means of mass miniature roentgenography of some 20,000 cases in Athens gives an indication of the probable rates.² This study included a cross section of so-called healthy groups of the urban population—office workers, factory workers, university students and military school cadets. The rates varied from 4 per cent active lesions in some groups of factory workers to 2 per cent in the cadets, supposedly the most healthy group. Tabulation of the results indicates that about 3 per cent of the cases studied show active tuberculosis and 7 per cent an inactive form—or approximately one in ten have a lesion of clinical significance.

The census of 1928 showed that 33 per cent of the population was urban and 67 per cent rural. With the 1940 census of 7,335,675 this would mean that 2,420,772 people live in the cities and 4,904,903 in the rural areas. With the incidence rates above applied to these figures it would appear that 72,623 have active tuberculosis and 169,454 an inactive form in the urban areas. As yet no studies of the rural areas have been made but it appears safe to assume that the rates are at least half those of the urban areas. On this basis there would be 73,573 active cases and 147,147 inactive cases among the rural population. Tabulation of the two groups shows a total of 462,797 clinically significant cases of tuberculosis, 146,196 of these active or "open" cases.

Experience has shown that about one third of the active cases on dispensary records die each year. On this basis, 48,732 deaths per year could thus be expected from the above totals. This figure may or may not be high but the most conservative estimates today would certainly place the deaths at least over 35,000 per year which is some four times greater than the official returns for 1938.

SANATORIA AND DISPENSARIES

It is generally accepted that for each death from tuberculosis there should be two beds available for patients suffering from the disease. This high standard manifestly cannot be applied to Greece. Even with a minimum of one bed per death, Greece is tragically short of its needs. At the present time (April, 1946) there are 4,586 beds available for all forms of the disease in public and private institutions (Table III). Of these 3,492 (76 per cent) are in the Athens area, 700 (15 per cent) in Salonika and the balance (394) in the various provinces and islands. Prior to the war there were an additional 1,205 beds available in public and private institutions which have had to close because of looting and structural damage during the period of occupation and recent civil war

(Table IV). At best, therefore, Greece had only a total of 5,791 beds available for tuberculosis. By the end of 1946 it is expected that an additional 1,860 beds will be available in State institutions which were started before 1939 but never completed and in new institutions projected with the help of UNRRA (Table V). Therefore, if every available bed is in use by the end of 1946, the sum total will be only 7,651 beds—far short of the estimated minimum needs of 35,000.

Not included in the above total are some 762 beds in so-called preventoria, all in the Athens area (Table VI). Some of these are first class institutions—actually hospitals for tuberculous children—others nothing more than summer camps for undernourished children.

In regards to dispensaries or tuberculosis clinics, there are at

TABLE III
EXISTING SANATORIA

<i>Name</i>	<i>Location</i>	<i>Ownership</i>	<i>Capacity</i>
Sotiria	Athens	State	2000
Daou Pendeli (for State employees)	Athens	State	100
Sismanoglion	Athens	Private	390
Voula (bone TB)	Athens	Private Charity	600
Glyfada (bone TB)	Athens	Social Insurance	22
Papanicolaou, H	Athens (Dionysos)	Private	120
Tsangaini	Athens (Melissia)	Private	150
Asimakopoulo	Athens (Melissia)	Private—	27
Agatza	Athens (Melissia)	Requisitioned	33
Papanicolaou, K	Athens (Melissia)	by the Army	50
Prophet Ilias	Kalamata	Private Charity	40
Trebellion	Patras	State	20
Argostoli	Cephalonia	State	22
Asvestochoria	Salonika	State	650
Municipal Hospital	Salonika	State	50
Elpis	Kavalla	State	200
Municipal Hospital	Iraklion	State	20
Spilia	Iraklion	State	20
.....	Syros	Private Charity	16
.....	Chios	16
.....	Lesbos	State	40
TOTAL			4586

present 26 in all of Greece dealing solely or in part with tuberculosis in any and all of its forms (Table VII). Of these, 23 are located in the Athens-Pireaus area and only 3 in the provinces. This was essentially the situation even pre-war though the Anti-tubercu-

TABLE IV
SANATORIA OPEN PREWAR — NOW CLOSED

<i>Name</i>	<i>Location</i>	<i>Ownership</i>	<i>Capacity</i>
Parnes	Athens	Private Charity	187
Apostoliddi-Economidou	Athens (Dionysos)	Private	80
Papademitriou	Athens (Melissia)	Private	100
Kalamboki	Athens (Melissia)	Private	30
Apostoli-Pentelikon	Athens (Kiffisia)	Private	25
Photiadon Peppa	Athens	Private	31
Papapetrou	Athens	Private	62
Korphoxyllia (Mannas)	Nr. Tripolis	State	70
Ithomi (Vitina)	Nr. Tripolis	State	130
Petra	Olympus	State	200
Karamani	Volos	Private	50
Khania	Crete	State	140
Antinissa	Lamia	State	50
Karditza	Volos	State	50
TOTAL			1205

TABLE V
PROJECTED SANATORIA FOR 1946

<i>Name</i>	<i>Location</i>	<i>Ownership</i>	<i>Capacity</i>
Imittos	Athens	Greek Army (veterans)	200
Dionysos	Athens	Greek Navy (veterans)	50
Makris	Tripolis	State	500
Georgiou	Sparta	State	180
.....	Agrinion	State	100
.....	Patras	State	200
.....	Yannina	State	200
.....	Iraklion	State	310
.....	Rethymnon	State	50
.....	Samos	State	20
.....	Syros	State	50
TOTAL			1860

TABLE VI
PREVENTORIA IN ATHENS AREA

<i>Name</i>	<i>Location</i>	<i>Supporting Organization</i>	<i>Capacity</i>
Sikiaridion	Melissia	Private Individual	150
Child's Providence	Kiffisia	Athens Club	175
Child's Nest	Kolargos	Private Organization for Care and Protection of Children	35
Children's City	Pendelli	Greek Society of Scientists for Protection of Children	80
Child's Life	Ekali	Child's Life Society	35
St. Damaskinos	Ayios Yannis Theologos	Church	30
Nea Sfaghia	Psychico	EOXA	40
Pipka	Elioupolis	Patriotic Foundation	100
Alpine Club	Kiffisia	Alpine Club	50
Fen	Pendelli	Friends of Youth Society	67
TOTAL			762

TABLE VII
TUBERCULOSIS DISPENSARIES IN GREECE NOW FUNCTIONING

A T H E N S

- As part of State Polyclinics under Attica-Boetia Health Center
 - Vathi
 - Byron
 - Peristeri
 - Kallithea
 - Patissia
- Predominately Tuberculosis under IKYP but under control of Attica-Boetia Health Center
 - Amarousi
 - Chalandri
 - Haidari
- Out-Patient Department of Sotiria Hospital
- Out-Patient Department of Laikon Hospital
- Municipal Dispensary of Athens
- Evangelismos Hospital Tuberculosis Clinic
- Panhellenic Union Against Tuberculosis
- Antituberculosis Society of Athens
- Institute of Social Insurance (IKA)
- Central Tuberculosis Clinic of PIPKA (children)
- Dispensary for Bone Tuberculosis (PIPKA)
- BCG Dispensary of Greek Red Cross
- Rizarion Mass Radiological Dispensary

P I R E A U S

- Drapetsona Polyclinic—State
- State Tuberculosis Dispensary
- Antituberculosis Society of Pireaus
- Institute of Social Insurance (IKA)

P R O V I N C E S

- State Tuberculosis Dispensary—Patras
- State Tuberculosis Dispensary—Salonika
- Mass Radiological Center—Salonika

losis Society of Greece did maintain for varying periods of time five dispensaries in several of the larger towns (Patras, Aigion, Drama, Lamia, Larissa). These have had to close because of restricted finances.

With the help of UNRRA 20 additional dispensaries are being planned in the larger cities of the provinces (Table VIII), but because of unavailability of suitable buildings it is not likely that more than one third of these will be open before the end of 1946. Actually Greece needs at least 30 dispensaries outside the capital area if any effective control measures are to be put into effect.

GOVERNMENTAL CONTROL PROGRAM

All public health measures are in the hands of the Ministry of Hygiene headed by a Minister who is a member of the cabinet. However, the tenure of office of Ministers in Greece is uncertain, especially these past few years, and the real power lies in the hands of a General Director of Hygiene who is a permanent civil servant. Practically all administrative powers are centered in his hands. There is no separate tuberculosis control office with a full time medical officer at present though such a position is now being considered.

Just prior to the war, Greece had embarked upon a well con-

TABLE VIII

PROJECTED DISPENSARIES

PELOPONNESE

Aigion
Amalia
Tripolis
Sparta
Kalamata

CENTRAL GREECE

Volos
Halkis
Missolonghi
Agrinnion
Gavalon
Larissa

NORTHERN GREECE

Yannina
Kavalla

ISLANDS

Khania — Crete
Heraklion — Crete
Rethymnon — Crete
Syros
Mytlline
Chios
Samos

ceived and ambitious tuberculosis control program but the events of the past five years have brought a stop to all organized effort and have rendered ineffective what good had been accomplished. This scheme, latent as it is now, was the culmination of 20 years of effort dating back to 1920 when the first law was passed assigning tuberculosis work to the Ministry of Interior. Progress was stopped, however, by the Asia Minor disaster. In 1929, with the help of the Health Department of the League of Nations, further progress was made with the establishment of a Sanitary School and a School for Nurses in Athens. In 1933, a law was drafted for the organization of a Central Tuberculosis Department but unfortunately it was never passed. Finally, in 1938, on the recommendation of a committee of experts especially appointed for the purpose, a law was passed putting the Ministry of Hygiene in charge of all anti-tuberculosis work. This plan was comprehensive in scope and provided for decentralization of the tuberculosis work. The work was to be regional in nature with anti-tuberculosis committees in each Nomos or administrative unit. It was planned that each Nomos should have at least one dispensary and sanatorium and some 10,000 beds were projected. However, recent events have made application of this law impossible.

The deficiencies in the present governmental set-up are numerous—some inherent and some due to present conditions. The lack of a central office of tuberculosis control in the Ministry of Hygiene has already been mentioned. Without this, it has been impossible to coordinate the efforts of the various governmental and private-voluntary agencies. Control in the ordinary sense of the word does not exist. No law for compulsory reporting of the disease is on the statute books and the State cannot forcibly isolate active and uncooperative cases nor can it force examination of contacts without their consent. There is no central national register of tuberculosis cases and admissions to state or private institutions are not coordinated. Statistical returns from sanatoria and dispensaries are meagre and unreliable.

The expenditure of funds for health purposes in general has always been small. For the year 1940-1941 the Ministry of Hygiene was allotted only 6 per cent of the total budget of \$120,000,000 for the country (\$7,200,000). Of this only \$550,000 was spent on tuberculosis work, mostly for sanatoria. All appropriations must be checked and approved by the Ministry of Finance and the amount of administrative delay is tremendous. The present unstable economic conditions and persistent devaluation of the drachma have rendered insufficient all existing appropriations.

The salaries of government employees have always been so small that interested and competent personnel has been difficult to

find. Much of the personnel has been employed on a part time basis which has made efficient work difficult.

Lastly, the serious damage to existing sanatoria and other institutions, particularly during the recent civil war, has thrown an additional financial burden on the State which it has been unable to meet because of the general economic conditions.

GENERAL OBSERVATIONS

Despite the fact that disease conditions have become progressively worse since the Axis occupation, it does not appear that tuberculosis is epidemic in Greece at this time. In the absence of adequate means for mass examination it has been difficult to evaluate actual conditions but it has been the experience of most observers³ who have conducted surveys that there is an absence of high incidence of acute forms in the susceptible younger groups which might have been expected. This may be due to the tendency of adults with the disease to migrate to the larger cities where better facilities for treatment are available, thereby lessening the probabilities of massive infection in the rural areas.

The state of the average peasant in the rural areas is a deplorable one. He leads a difficult economic life striving against great odds to eke out an existence from an inhospitable soil, with old and improvised equipment. The brutality of the invader has laid waste his fields and devastated his home and he finds himself in a precarious plight as far as the future is concerned. Chronic malnutrition, prolonged lack of adequate shelter and economic privation make him an easy prey for disease. An open case spreading infection in such an environment will find ready victims and an infecting dose which in other communities might do little or no damage may in these cases have dire results. Each community has its own problems. For some it is lack of food, others shelter, and still others clothing. Actually the shortage of food now is not as great as it may appear, for UNRRA has imported huge quantities of food stuffs. The main difficulty is lack of adequate transportation and high cost. However, even pre-war there was chronic malnutrition in many areas and 30 per cent of the population was undernourished. During the famine years of 1940-1941 when the caloric intake was reduced to 750-900 calories per day the increase in general death rate was five-fold.⁴

Voluntary organizations which have, in the past, accounted for a great share of the anti-tuberculosis work have been forced by dint of financial difficulties to curtail their activities and to rely more and more on government subsidies. This has resulted in loss of initiative. The only private organization of any importance functioning in Greece today is the Anti-tuberculosis Society of

Greece. It was incorporated in 1925 and instituted an ambitious program of dispensaries and propaganda. Since its inception, it opened and maintained seven dispensaries throughout Greece but financial limitations have forced the closure of all except those in Athens and Pireaus. The Panhellenic Union Against Tuberculosis which was founded in 1901 and has maintained a dispensary in Athens since then has in recent years contributed very little and for all practical purposes is extinct.

Damage to existing sanatoria has been considerable, especially in regard to structural matters, and many have had to close. A great deal of equipment has been stolen and the rest deliberately and wantonly destroyed. There is particularly an acute shortage of x-ray and laboratory equipment. There is lack of coordination between State and private institutions and the former suffer especially from poor administration.

Dispensary service in Athens is fairly good but suffers from lack of coordination, limited finances, varying standards, and inadequate personnel. Benefits are limited to diagnosis and pneumothorax therapy with little attention to follow-up in the home. Quarters are cramped in almost all instances and inadequate for the volume of work done. Records are poorly kept and clinical histories inadequate, except in the State polyclinics where a too elaborate and complicated system is used. Most dispensaries have some sort of fluoroscopic apparatus but only a few have a machine capable of taking x-ray films. In these instances, the dark-room facilities are very inadequate and account to a great extent for the poor quality of the work. Visiting nurse service is limited only to a few of the larger State clinics and no health education activities are practiced.

Preventoria anywhere approaching the modern conception of the word have been a late development in Greece, having their origin in 1943. At that time a Preventorium Bureau was set up by the Swiss Red Cross Mission in Greece with the dual purpose of encouraging the establishment of new ones and to lay down standards for their use.⁵ Within the year, the number of preventoria increased from 3 to 17 and the number of beds from 140 to 1,000. Practically all of these institutions were started and supported by voluntary effort. However, the ravages of war and the depletion of financial resources have forced the closing of some of them and at the present time there are only 10 open with some 750 beds (Table VI). Clinical standards in these institutions and criteria for admission show a great deal of variance. Children with varying manifestations of lung disease are very often intermingled with children showing no evidence of tuberculous infection or disease. With cessation of activity of the Preventorium Bureau the re-

sponsibilities have been assumed by the Ministry of Welfare which has delegated the administration to the Patriotic Foundation (PIPKA) which is primarily concerned with children.

There is no lack of medical talent in Greece today and competent tuberculosis specialists are numerous. Most of them have had postgraduate training in Germany, Switzerland or France. Opportunities for postgraduate study in Greece are limited to Sotiria Hospital, the only accredited institution. Despite the lack of literature during the occupation, the Greek doctors have managed to keep abreast of latest developments. Their theoretical knowledge is considerable but practical application and clinical judgment is very often weak.

An acute shortage of trained nurses exists. Even before the war, the nursing profession was poorly developed for it was not considered a genteel calling. Reliance is placed mainly on practical nurses who in most instances are nothing more than orderlies and hardly capable of taking care of the nursing needs of patients or of being of any professional assistance to the doctor.

The degree of popular prejudice against and fear of tuberculosis is considerable. Tuberculosis is considered a social stigma and every effort is made to hide the condition. This leads to delayed diagnosis. People are reluctant to rent their properties for dispensary use and even fight against the establishment of a clinic in the central part of a town. Until recently there was no organized public information service of any note and health education was non-existent.

CLINICAL ASPECTS

Research in Greece during the period of occupation was manifestly difficult but the effects of starvation on tuberculosis was studied by Chortis⁶ in a series of 108 patients who had tuberculosis and hunger edema during the famine period of 1941-1942. The common histologic changes noted were a cloudy swelling of the parenchyma cells in all the organs, serous impregnation of the interstitial cells and complete disappearance of fat vesicles. Tuberculous localization in the viscera was common due to frequent bacilleemia and decrease of local resistance. He noted that there was reversal to an acute exudative form of the disease with rapid and fatal progression. This he attributed to various biological factors producing a great decrease in the general immunity and resistance against tuberculosis and to mechanical factors producing great increase in the respiratory function of the lung with rupture of the involved lung tissue and extension of the disease.

Mass miniature radiographic studies in Athens have revealed an alarmingly high incidence of acute exudative tuberculosis in

young adults and relatively few of the chronic proliferative lesions with cavities in the older age groups.

The results of a study of 8,547 diagnosed cases of tuberculosis at this mass roentgenography are interesting. These were patients who were receiving supplementary food rations because of active tuberculosis and the study was made to eliminate those who did not show evidence of clinically significant lesions (Table IX).⁷ A total of 1,662 or 19.5 per cent in the various categories examined revealed no demonstrable x-ray evidence of the disease. It is also interesting to note that 948 or 11.9 per cent of the total examined had x-ray lesions of no clinical significance.

The problem of tuberculosis in children is especially severe. Actual figures are not available but the number of children dying of the reinfection type of disease is great. This is obviously due to the opportunities for massive infection from diseased parents and relatives during childhood. Undernourishment, privation and deplorable living conditions have rendered most children "pre-tuberculous," to use a term so extensively used in Greece. The term "adenitis" is also universal and is loosely applied to all sorts of vague conditions. Tracheobronchial and hilar adenopathy are favorite diagnoses on fluoroscopy. Tuberculin testing to any extent is done only in Athens and then mostly in relation to the B.C.G. work done there. The Pirquet reaction is preferred to the Mantoux technique because of the prejudice of Greek mothers to needles.

The work on B.C.G. is one of the major activities of the Greek Red Cross. It was started in 1925 and has continued uninterrupted

TABLE IX
RESULTS OF EXAMINATION OF DIAGNOSED
CASES OF TUBERCULOSIS

	Total Examined	Clinically Significant	Not Clinically Significant	Under Further Observation	Normal	Per cent Normal
War Veterans	1623	676	485	0	462	28.4
Tuberculous Students	822	554	73	25	170	20.7
Social Insurance (IKA)	1846	1293	138	130	285	15.4
Sotiria Out-Patients	638	530	40	19	49	7.7
Patients in Environs of Athens	1161	727	85	59	290	24.9
Newly Registered for Certification	2457	1765	127	159	406	16.5
TOTALS	8547	5545	948	392	1662	19.5

since then. At present there is only one center in Athens and an average of 135 new individuals a month are registered. The vaccine used is manufactured at the Pastuer Institute in Athens from an original strain brought from Paris in 1920. Conclusions based on the work done from 1925 to 1939 on 7,411 families have been reported as follows:⁸ (1) Vaccination with B.C.G. is effective and without danger if given under the supervision of skillful and competent personnel. (2) The physical development of vaccinated children is far superior to the non-vaccinated ones. (3) The morbidity of vaccinated children is one third that of non-vaccinated children living under the same conditions as regards the infectious diseases. (4) The general death rate of vaccinated children has been one seventh that of non-vaccinated children.

In general, it is concluded that vaccination with B.C.G. is a biological method that can protect against tuberculosis. These findings are encouraging and coincide with the original work of Calmette and other more recent investigators. However, the number of cases in Greece has been small and the work has not been too well controlled mainly because of the lack of personnel, reliance upon the Pirquet reaction and the lack of free and extensive use of the x-ray. Though the workers have tried to collect accurate statistics, the screening of the family has been superficial and the determination of a tuberculous environment not always certain. But whatever the present feeling is about B.C.G., if it can be depended upon to produce a fairly high immunity for a few years during early childhood, its value will be immense in a country like Greece where the infant mortality from tuberculosis is so high.

X-ray work in general is of poor character. There is an acute shortage of x-ray machines and film. Most of the machines which do exist are of German make (Siemens) and of good quality but have been rendered ineffective by lack of replacements and damage. X-ray technicians do not exist, the radiologists taking and developing their own films. There has been practically no film available for the past five years and an x-ray film of a chest is seldom seen. Great reliance is placed on fluoroscopic study and this form of examination has practically supplanted all others. Facilities for examination of the sputum are generally lacking and where present, are limited to plain smears. Few if any laboratories are equipped for examining sputum by the concentration method or for the examination of the aspirated fasting gastric contents.

Pneumothorax therapy is widely used but there is little uniformity on indications for induction and maintenance. Initial treatments are usually made on an ambulatory basis in dispensaries or private clinics or at the patients' home, for no hospital beds are available for this purpose, except in sanatoria. Tuberculous

patients are not permitted in general hospitals even for induction of collapse therapy. Surprisingly few traumatic pneumothoraces at time of induction have occurred. Subsequent refills are controlled by fluoroscopy, the amount and frequency of refills varying a great deal. Some 734 patients were on file in 1944 in the Athens dispensaries and these received 12,874 refills during the year. Thoracic surgery is available only in the larger sanatoria or in private surgical clinics and is relatively new in Greece. Bronchoscopy is practically never used.

DIAGNOSTIC NOMENCLATURE

There is complete lack of uniformity of terminology in the diagnosis and classification of tuberculosis. Most clinicians use the German or French systems of classification which are based exclusively on the various types of pathological lesions. The typical complex classification used in the State dispensaries in Athens is based mainly on the x-ray appearance and is as follows:⁹

A. Chronic Forms

- 1) Ulcerative and caseous spreading—stationary or progressive.
- 2) Ulcerative and caseous localized—stationary or progressive.
- 3) Fibrous and caseous spreading—active or inactive.
- 4) Fibrous and caseous localized—active or inactive.
- 5) Fibrous and sclerotic—active or inactive.

B. Acute Forms

- 1) Congestive tuberculosis (adenopulmonary form or metastatic lobitis).
- 2) Caseous pneumonia.
- 3) Tuberculous bronchopneumonia.
- 4) Tuberculous pneumonia.
- 5) Miliary tuberculosis (acute, chronic and latent).
- 6) Pleurisy (exudative and dry).
- 7) Pleuropleuritis.
- 8) Typhobacillosis form.

There is no simple practical classification which can be used for statistical purposes and general convenience. Such a classification based on that adopted by the National Tuberculosis Association in America¹⁰ has recently been proposed by the author and has already found favor with a goodly number of clinicians. Since the main difficulty was in reference to the pulmonary form, the proposed classification was designed primarily for the reinfection form of the disease. No attempt was made to give a complete picture of the disease but rather to select descriptive terms which gave a brief and practical picture of conditions. As in the

N.T.A. classification it was found desirable to incorporate in the classification a reference to the extent of pulmonary lesion, severity of symptoms and clinical status of the case. This was designed to apply particularly to the initial or provisional diagnosis which is made when the patient is first evaluated. However, it was felt that diagnosis of a case of tuberculosis could not be considered adequate unless some approximate conception of the nature of the tissue reactions was added. For this reason a reference to the pathological character predominant and a more rigid evaluation of the clinical status was incorporated in the final diagnosis. It was emphasized that this was dependent upon complete study of the case and observation over a sufficient period of time. The proposed scheme of classification is as follows:

Classification of Tuberculosis

I. Primary Type Pulmonary Tuberculosis

Active
Healed

II. Reinfection Type Pulmonary Tuberculosis

For Initial Diagnosis

<i>Side</i>	<i>Extent</i>	<i>Severity of Symptoms</i>	<i>Clinical Status</i>
Right	(I) Minimal	(A) None	Active
Left	(II) Moderately advanced	(B) Slight (C) Moderate	Inactive
Bilateral	(III) Far advanced	(D) Severe	Uncertain activity

For Final Diagnosis

Side

Right
Left
Bilateral

Extent

(I) Minimal
(II) Moderately advanced
(III) Far advanced

Severity of Symptoms

(A) None
(B) Slight
(C) Moderate
(D) Severe

Pathological Character Predominant

Exudative
Productive
Fibroid

Cirrhotic
Mixed
Cavity: size
Clinical Status
Apparently cured
Arrested
Apparently arrested
Quiescent
Active
Improved
Unimproved
Dead

III. Extra-pulmonary Tuberculosis

Type	Severity
------	----------

This classification has been submitted to the Ministry of Hygiene for consideration and it is anticipated that the Ministry will adopt it as it is or in some modified form for use in its clinics and institutions.

PRESENT CONTROL ACTIVITIES

The anti-tuberculosis work in Greece has taken new impetus with the arrival of UNRRA in the early months of 1945. With its full time imported personnel, financial resources and impartial outlook, UNRRA has been in a position to coordinate the work and to advise the Greek Government on many important matters. In no instance has there been greater cooperation than between the Ministry of Hygiene and the UNRRA Tuberculosis Department and whatever good has been accomplished to date has been done through joint action of the two.

It was recognized early, that the problem of tuberculosis was too great to be solved during the life of UNRRA so its activities were directed towards three ends: (1) The importation of sufficient medical supplies and hospital equipment to supply the acute deficit caused by the war and the giving of technical advice as to their best utilization. (2) The gathering of statistical and other information as to the actual severity of the problem, and (3) The laying of the foundations for a comprehensive tuberculosis control program which could be carried out by the Greek Government after the life of UNRRA.

To better accomplish these aims five consulting teams, each consisting of an imported tuberculosis specialist, a tuberculosis nurse, and a clerk-interpreter locally employed, were provided for. These traveled over all parts of Greece, coordinated local effort, gave advice, determined the needs and gathered information. Periodic reports were tendered to the Chief Consultant in Athens

who correlated the work and kept in close liaison with the Ministry of Hygiene. To date, substantial progress has been made along many lines through joint action of UNRRA and the Ministry of Hygiene. Some of the major lines of activity have been as follows:

1. The establishment of a separate Bureau of Tuberculosis in the Ministry of Hygiene and the appointment of a tuberculosis controller for the country. This proposal has been accepted by the Greek Government but the actual budgeting for such a department has not as yet been provided for. However, the probable director of this service has been unofficially working in close cooperation with UNRRA, pending his official appointment and an official circular relative to statistical returns has already been sent out to all State dispensaries and institutions.

2. The provision of some 2,600 additional beds for tuberculosis by the end of 1946. This will be accomplished by the reopening of 700 beds in institutions which functioned prewar, by additions to existing sanatoria, and by 1,860 beds in newly projected institutions. It was not considered advisable to embark on a scheme to open all closed institutions or to program for the full 35,000 beds needed at this time as the capital expenditures and maintenance costs are quite beyond the financial abilities of the Greek Government.

3. The distribution of large quantities of medical supplies and hospital equipment including stationary and mobile x-ray sets, mass miniature radiographic units, x-ray film, pneumothorax apparatus, thoracic surgical instruments and laboratory equipment, to both State and charitable institutions. Complete surveys of all needs have been made and available supplies allocated on a priority basis. Complete 40 and 200 bed hospital units have been available for immediate use.

4. The equipping and improving of existing dispensaries. A complete survey of the Athens dispensaries has been made and detailed plans for their reorganization and coordination are now under consideration. Clinic records have been revised and simplified and minimum standards for dispensary service set up. These have been submitted to the Ministry of Hygiene for adoption.

5. The opening of new dispensaries. Wherever possible these will be opened as part of polyclinics, for it is recognized that tuberculosis cannot be divorced from the health needs of a community in general, and the Government has already programmed for polyclinics. Nineteen centers of population have been chosen as places most urgently needing clinics (Table VIII). However it is not likely that all of these will be opened very soon for there is an acute shortage of suitable buildings in most towns, especially public buildings which were a favorite target during the civil war. Landlords are unwilling to rent their private buildings to the State,

for under Greek law payment of only 8 times the prewar rental is permitted as a maximum. At a time when the cost of living has risen a hundredfold and the drachma has become so devaluated, one can readily understand their reluctance. The only recourse has been the requisitioning of buildings and even this power is applicable only to uninhabited dwellings, which is seldom the case. A practical solution to this difficulty will be dealt with further on.

6. The establishment of special centers for the examination of children with tuberculosis. Four such centers in the Athens area were proposed with the dual purpose of certifying children with tuberculosis who should receive supplementary food rations and the selection of children for preventorium care. It was recognized that the problem of tuberculosis in children is a particularly difficult one and must be dealt with separately. The plan calls for a special committee of experts under the auspices of the Patriotic Foundation (PIPKA) to organize the clinics and to establish the criteria and standards of diagnosis.¹² Cases for preventorium care would be selected from patients with active pulmonary tuberculosis with negative sputum whether primary or reinfection type (the so-called "closed" cases). In this respect the entire matter of preventoria was clarified. Existing institutions were divided into two broad groups: Group A to consist of those institutions which serve as summer camps for non-tuberculous undernourished children, and Group B of institutions for tuberculous children with non-infectious forms of the disease, excluding bone tuberculosis.¹³ Group B consists actually of tuberculosis hospitals for children but are to be called preventoria in order to minimize the stigma of tuberculosis. Standards for the functioning of both of these groups have been developed. At present, all these institutions are under the control of the Ministry of Welfare but it has been recommended that the latter group be turned over to the Ministry of Hygiene where they more properly belong. Statistical information is meagre but it appears likely that there is an immediate need in Greece for at least 6,000 beds for children with definite pulmonary lesions.

7. The introduction of mass-miniature roentgenography into Greece. This has readily appealed to the fancy of Greek medical thought and already two centers have been opened, one in Athens, the other in Salonika, through the efforts of Greek doctors in cooperation with the Greek Red Cross, Greek War Relief Association and the Government. For the time being these will have a dual purpose: the examination of known cases of tuberculosis to determine which have clinically significant lesions and therefore entitled to supplementary food rations, and the examination of the supposedly healthy along conventional lines to determine

incidence rates. The standard of work in these centers is exceptionally high and is an indication of what can be done by the Greeks themselves when given the means. Three additional mobile units for use in the regions have been programmed for and should be in the field by the end of 1946. Within the year over 100,000 miniature chest examinations will have been made.

8. The extension of supplementary food rations for tuberculous patients to all of Greece. By joint agreement of UNRRA and the Ministries of Health and Supply¹⁴ it was decreed that only those patients with clinically significant tuberculosis certified by adequate radiological methods should receive supplementary food rations since the supply of food was limited. Such determination in the areas where mass roentgenography was available was easy but the shortage of x-ray facilities in the regions discriminated against the tuberculous outside of Athens and Salonika. To remedy this a revised plan was therefore proposed for the regions based on clinical, laboratory and fluoroscopic findings, as a temporary expedient pending availability of more adequate radiological facilities.

9. The formation of a National Tuberculosis Association of Greece. The need for such a national voluntary association, similar to those which have proven so successful in the United States and Great Britain, to coordinate the work of all voluntary agencies and to cooperate with and advise the government was readily obvious. Accordingly the interests of some of the outstanding professional and lay people of Greece were aroused and such an organization was launched in May 1945. It has made rapid strides since then and has already established branches in several regions. Affiliation with the other tuberculosis societies has been effected and a coordinated program of public education and propaganda has been worked out.

FUTURE CONSIDERATIONS

Tuberculosis is a public health problem and as such the chief responsibilities for its control and eradication belong to the State. Put briefly the tuberculosis needs for Greece today are five-fold: more beds, more dispensaries, better personnel, health education and rehabilitation. Much of this is but a matter of money. It has been conservatively estimated that along the established lines of tuberculosis care the opening of 20,000 beds and 20 dispensaries alone would entail the expenditure of \$30,000,000 for capital expenses and \$12,000,000 yearly for maintenance.¹⁵ Obviously the Greek Government today is in no position to assume such responsibilities. If the example of Great Britain is followed and recourse is made to some form of compulsory insurance, a partial

solution may be effected. It is estimated that there are about 2½ million wage earners in Greece. At 10 cents a head per week a total of \$12,500,000 could be raised each year which would at least underwrite the maintenance costs for the dispensaries and institutions.

The critical shortage of beds must be met by some means or other. The paucity of existing institutions, the difficulty of reopening those which have been forced to close, and the lack of suitable buildings for new ones have all been commented upon. At best no more than a total of 7,600 beds can be expected to be open in the near future and it is questionable whether even this small amount will be available within the year. The only solution therefore is to resort to prefabricated buildings and if these can be imported into Greece in sufficient numbers to meet the needs for sanatorium beds and dispensaries, then, and only then, can the tuberculosis problem be attacked at all effectively. Such low cost accommodations are readily assembled, easily transported and can be used to augment existing institutions. The Greek Government has recognized their practicability and has authorized the immediate expenditure of \$1,000,000 for the purchase of sufficient buildings to accommodate 5,000 beds and 30 polyclinics. At this writing, release of the steel necessary for their production is delaying matters.

It is becoming increasingly obvious that Greece must depend on outside help for its fight against tuberculosis. The only private organization today with the necessary financial and administrative resources for this purpose is the Greek War Relief Association of America which has committed itself to a 5 to 10 year health program in Greece. Its plans call for the establishment and maintenance of rural health clinics throughout Greece. Heretofore it wasn't particularly concerned with the question of tuberculosis but of late it has recognized the necessity of joining the common front and plans are now under consideration for underwriting its financial implications.

Finally, from a broader aspect, tuberculosis in Greece is not a local matter but fits in with the health problem of Europe in general. It is probable that similar conditions exist in other countries, certainly in Yugoslavia and Poland. In this respect it becomes a matter for international action and it is most likely that this fact will be taken into consideration when the new International Health Organization is formed by the United Nations Organization.

SUMMARY

1. Tuberculosis is the most important single health problem in Greece today and is 3 to 5 times more serious now than prewar.

2. It is not epidemic at present but chronic malnutrition, overcrowding, lack of shelter, economic privation and depletion of physical reserve make the threat a grave one.

3. The tuberculosis deaths are well over 35,000 per year and the estimated morbidity 460,000 in a population of 7,300,000. Incidence rates for urban areas are 3 per cent active and 7 per cent inactive lesions; 1½ per cent and 3½ per cent respectively for rural areas.

4. There is a critical shortage of at least 30,000 tuberculous beds and 30 dispensaries. This shortage can be best met by use of prefabricated buildings.

5. Economic difficulties have caused voluntary organizations to curtail their activities, lose their initiative and to rely more and more on governmental subsidies.

6. Popular prejudice and fear of tuberculosis is considerable and health education is lacking.

7. The well conceived antituberculosis program of prewar Greece has been torn asunder and rendered ineffective by the events of the past five years.

8. Present control activities are directed towards equipping existing sanatoria and dispensaries, opening new ones, elevating standards, introducing mass miniature roentgenography and the formation of a National Tuberculosis Association of Greece.

9. The Greek Government is unable to undertake its financial responsibilities as regards to tuberculosis and must be assisted by outside help.

10. The problem of tuberculosis in Greece is not a local one and must be considered by any new health organization to be set up by the United Nations Organization.

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RESUMEN

1. La tuberculosis es hoy el problema sanitario más importante de Grecia y es de 3 a 5 veces más grave ahora que antes de la guerra.

2. Actualmente no es epidémica, pero la desnutrición crónica, el apiñamiento, la falta de asilo, la privación económica y el agotamiento de la reserva física presentan una amenaza grave.

3. Las muertes por tuberculosis son mucho más de 35,000 al año y la estimada morbilidad es de 460,000 en una población de 7,300,000 habitantes. En las zonas urbanas la frecuencia de lesiones activas es del 3 por ciento y de lesiones inactivas es del 7 por ciento. En las zonas rurales la frecuencia es del 1½ por ciento y del 3½ por ciento, respectivamente.

4. Existe un déficit crítico de 30,000 camas y 30 dispensarios

para tuberculosos, por lo menos. La mejor manera de hacer frente a este déficit consiste en emplear edificios prefabricados.

5. Las dificultades económicas han obligado a las organizaciones voluntarias a restringir sus actividades, perder su iniciativa y depender más y más de subvenciones del gobierno.

6. El prejuicio popular y el miedo a la tuberculosis son considerables, y falta la educación higiénica.

7. El programa antituberculoso bien concebido que existía en Grecia antes de la guerra ha sido destrozado y vuelto ineficaz por los acontecimientos de los últimos cinco años.

8. Actualmente las actividades para el control tienen por objeto equipar los sanatorios y dispensarios existentes, establecer otros nuevos, elevar las normas, introducir la roentgenografía en miniatura colectiva y la formación de una Asociación Nacional de Tuberculosis de Grecia.

9. El gobierno griego no puede cumplir sus obligaciones financieras con respecto a la tuberculosis y debe ser asistido por ayuda del exterior.

10. El problema de la tuberculosis en Grecia no es un problema local, y debe ser considerado por cualquiera nueva organización sanitaria que establezca la Organización de las Naciones Unidas.

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EDITORIAL

FUTURE STUDIES

of

PSYCHOSOMATIC FACTORS IN PULMONARY TUBERCULOSIS

The study and classification of the psychosomatic aspects of pulmonary tuberculosis have scarcely begun. It will take years to properly evaluate the necessary thousands of cases in order to place the psychosomatic aspects of the disease in their proper perspective and classification.

In this issue of *Diseases of the Chest*, you will find a study of 100 consecutive army cases. This is one of the first, if not the first, comprehensive studies of the kind covering a large number of cases of pulmonary tuberculosis.

Studies of this kind of large groups of patients are our only hope for further progress in this subject, because of the time element and cost in evaluating these problems in a large series of cases in civil practice. It is possible that personality profiles, as compiled by Dunbar may prove of value as an aid and may save much time in the future study of psychosomatic factors where a great number of cases are being considered. That psychosomatic factors do play a definite part in the etiology, symptoms, course, prognosis, cure and rehabilitation of these patients, must now be recognized.

Medical science has made great progress during the past two decades. New laboratory and x-ray procedures, improved surgical technic, the discovery of new drugs, chemicals and vaccines, have all but controlled the acute infectious diseases. While these diseases were being conquered, chronic illnesses and infectious diseases have increased and now demand a greater portion of our time. Chronic diseases are the ones which present psychosomatic problems.

Psychosomatic medicine is established. There is little doubt that all medicine will be psychosomatic in the future. It is therefore important that physicians and students of medicine recognize this fact.

Psychosomatic medicine cannot supplant medical science, however medical science will remain only a science, cold and unfeeling, unless we combine medical science and psychosomatic medicine. When this is done we will then have, truly, the art of medicine.

C. M. H.

COLLEGE AWARD



The above medal was designed by Carroll N. Jones, 1st Lt., MAC, Washington, D. C. and approved by the Board of Regents of the American College of Chest Physicians at their Annual Meeting in San Francisco, June Twenty-seventh, Nineteen hundred forty six.

Committee on College Awards

On June 17, 1945, the Board of Regents established the College Medal to be officially presented to a Fellow of the American College of Chest Physicians, annually if feasible, by the College for some meritorious service in furthering progress in the field of Diseases of the Chest.

- I. (a) Meritorious service in the field of Diseases of the Chest shall be interpreted as follows: All subjects which have a direct bearing on the advancement in the diagnosis, treatment, and control of all Diseases of the Chest, either by the application of clinical science, education, improved socio-economic conditions or a particular contribution to the College of Chest Physicians, whereby the College may improve its services to its Fellows and the public welfare;
- (b) The work upon which this is based must have been done in whole or in part either in the United States or any other country where a representative, active chapter of the College exists;
- II. The work shall be administered under the supervision of the Board of Regents by a "Committee on College Awards," consisting of five members appointed by the President, with the provision that no less than two and no more than three members shall be appointed each year;
- III. (a) The Committee may appoint Fellows of the College, in reasonable number, who shall each maintain a close contact with a particular field of the realm of Diseases of the Chest and shall report to the Committee any special meritorious work which has been accomplished in this field;
- (b) If considered necessary the Committee may appoint a small Board of Referees to visit a Fellow of the College and investigate his work, in order to furnish the Committee with a first-hand opinion as to the merit of his work;
- (c) The Committee, after a complete survey of all reports, may select a recipient or recipients for the Award and should inform the President of the College of its choice at least sixty days prior to the annual meeting;
- (d) The College reserves the right to make no award if a sufficiently meritorious piece of work has not been recommended;
- IV. (a) If the recipient of the College Award has been chosen because of a purely scientific contribution to the field of Diseases of the Chest, he shall file a written treatise on his work with the College and present the results in a paper before the annual meeting;
- (b) If the recipient is chosen for meritorious work in some other field than pure science, he will submit a resume of his particular work and file same with the College and present the resume before the annual session;
- (c) In either case, the President of the College will officially present the Award to the recipient immediately following the presentation of such treatise or resume.

The President has appointed the following Committee on College Awards:

Major General S. U. Marietta, Washington, D. C., *Chairman*
Edward W. Hayes, M.D., Monrovia, California, *Vice-Chairman*
Donato G. Alarcon, M.D., Mexico City, Mexico
William E. Ogden, M.D., Toronto, Canada
J. Winthrop Peabody, M.D., Washington, D. C.

The Board of Regents of the College is extremely desirous of giving the award to one of the members selected for the most outstanding work pertaining to the specialty of diseases of the chest during the current year. The Committee appointed by the President will make a study of the entire matter so that due consideration may be given to all members doing special work when a selection for the recipient of the award is decided upon.

The Chairman of the Committee on College Awards requests that any information and data regarding work being carried on by any member of the College which would entitle him to consideration for the College Award be sent to him. Please address this correspondence to Major General S. U. Marietta, 3133 Connecticut Avenue N. W., Washington 8, D. C., Chairman of the Committee.

At the Annual Meeting of the Board of Regents of the College, which was held on June 27 at San Francisco, the design for the medal was approved. A cut of same is shown on the opposite page.

OPPORTUNITIES FOR TRAINING IN THORACIC SURGERY IN VETERANS ADMINISTRATION HOSPITALS

There are several Veterans Administration hospitals in which outstanding part-time and full-time surgeons could supervise the teaching program in thoracic surgery. The positions in these institutions would be ideal for young men who have had three or four years training in general surgery and who are interested in further training in thoracic surgery.

DOLL SIZE LABORATORIES TO PROVIDE DATA FOR X-RAY EXPANSION

Three dimensional models, a tool commonly employed by industrial architects and planning engineers for arriving at the most efficient utilization of production space, have been adapted by the Westinghouse X-Ray Division to assist in rehabilitating and expanding the nation's war-worn x-ray facilities.

The new system—to be offered first to the medical profession and under consideration for industrial x-ray users as well—eliminates the flat two dimensional drawing or blueprint from early planning and substitutes instead tiny scale models of apparatus, partitions, floors, and outer walls. It permits duplication of existing or proposed facilities in miniature and makes possible endless arranging and rearranging until each room and every unit of apparatus is located to the satisfaction of the architect, hospital authorities, and doctors.

Wartime use of the mass chest survey both in industry and the armed services to detect and treat tuberculosis in its early stages has proven so satisfactory that this aspect of public health will be vastly expanded with a consequent demand for still more x-ray equipment.

Three Dimensional Studies are completely new to the radiological field. They represent a significant forward step in speeding better x-ray facilities for the medical profession.

Board of Examiners

Oral and written examinations for Fellowship in the College were given at San Francisco on June 29, during the Annual Meeting of the College. Dr. E. W. Hayes, a member of the Board of Examiners of the College, was assisted by Drs. Hudson, Placak, Joannides, Peabody and Sharp in conducting the examinations. Dr. H. I. Spector, Chairman of the Board of Examiners, due to his sudden illness and subsequent death, was unable to participate in the examinations which had been prepared so carefully and excellently by him.

Thirty-two candidates for Fellowship took the examinations. The questions used in the written examinations were as follows:

THORACIC MEDICINE — A

1. Discuss the essential fundamentals in the treatment of active pulmonary tuberculosis of the clinical or secondary type occurring in an individual between twenty and forty years of age.
2. Outline the setting up and operating mechanism of a tuberculosis control program for a given community.
3. Discuss briefly tuberculous empyema as a complication of artificial pneumothorax with special reference to its prevention and treatment.

THORACIC MEDICINE — B

1. Give the early symptoms and signs of a bronchogenic carcinoma.
2. Classify tumors of the chest.
3. Discuss briefly from the viewpoint of diagnosis the following diseases:
 - (a) Sarcoid of the lungs.
 - (b) Loeffler's Syndrome.
 - (c) Coccidioidal disease.

THORACIC SURGERY

1. Briefly name and describe the various methods employed for collapse therapy in the treatment of pulmonary tuberculosis.
2. Discuss only the salient points in regard to preoperative and postoperative care following operations upon the lung, with special reference to:
 - (a) Preoperative and postoperative therapy.
 - (b) Possible complications following the use of intrathoracic anesthesia.
 - (c) Management of postoperative developments in the thoracic cage on the operated side.
3. Outline of various forms of treatment of lung abscess.

PATHOLOGY

(Answer only one of the following two questions)

1. Enumerate the causes and consequences of bronchostenosis and describe gross and microscopic findings in a bronchostenotic lesion.
2. Discuss fungus diseases of the lung and describe gross and microscopic appearances of two of them.

PHYSIOLOGY

(Answer any one of the following two questions)

1. Discuss Vital Capacity.
2. How does the inhalation of noxious gases upset the normal respiration? Discuss the mechanism.

BACTERIOLOGY AND IMMUNOLOGY

(Answer any one of the following two questions)

1. Name the fungi which may cause infections of the respiratory tracts or of the lungs.
Give a brief description as to methods (technics) which might serve to aid the differential diagnosis in such infections.
2. How may tests be carried out with tuberculin or its products? What significance may one attach to such tests? What is the supposed mechanism of the positive skin test?

*The following candidates for Fellowship successfully passed
the oral and written examinations*

Herbert Bauer, M.D., San Luis Obispo, California
John J. Brosnan, M.D., Chicago, Illinois
Charles J. Caul, M.D., Kearney, Nebraska
Charles B. Craft, Major, MC, Denver, Colorado
Samuel D. Daniels, Major, MC, San Francisco, California
Isaac Epstein, M.D., Alexandria, Louisiana
Louis L. Friedman, M.D., Birmingham, Alabama
Y. Fred Fujikawa, M.D., Mt. Vernon, Missouri
Morton Gibbons, M.D., San Francisco, California
Robert Glass, M.D., Staten Island, New York
Leon H. Gorfinkel, M.D., Los Angeles, California
George R. Hodell, M.D., Houston, Texas
Francis T. Johnson, M.D., Monrovia, California
Robert E. Joseph, M.D., Salem, Oregon
Martin Kettler, M.D., Glenn Dale, Maryland
Frank Lamberta, M.D., Jamaica, L. I., New York
E. E. Lundegaard, M.D., Santa Ana, California
Bernard McGovern, M.D., Los Angeles, California
Leonard Munson, M.D., Sanford, Florida
Arnaldo Neves, M.D., Mt. Vernon, Missouri
S. Barre Paul, M.D., San Francisco, California
Paul E. Pifer, M.D., Kenosha, Wisconsin
Charles W. Rudolph, M.D., Tucson, Arizona
Jewell Mae Sanders, M.D., Berkeley, California
Maurice Shoor, M.D., Los Angeles, California
Paul Smith, M.D., Olive View, California
M. M. Szucs, M.D., Youngstown, Ohio
Paul G. Thode, M.D., Tahliana, Oklahoma
Lewis S. Trostler, M.D., Albuquerque, New Mexico
William C. Wenkel, M.D., Olive View, California
Julius Zelman, M.D., San Bernardino, California

Report of the College Committee to Cooperate with the Advisory Board for Medical Specialties

The following resolution was introduced before the Board of Regents at its annual meeting at San Francisco, June 27, 1946, and unanimously approved. The resolution was later presented to the general assembly of the College and approved by the assembly:

WHEREAS, The practice of diseases of the chest is a broad and interrelated specialty, and

WHEREAS, The chest specialist must be versed in the medical, surgical, radiological and endoscopic aspects of all diseases which appertain to the chest, and

WHEREAS, There is no one board which is now established to certify physicians and surgeons in the specialty of diseases of the chest as indicated above, and

WHEREAS, Certain other boards which have both medical and surgical problems have been established as boards independent of internal medicine and surgery, and

WHEREAS, It is the desire of the American College of Chest Physicians that basic requirements which are to be met by candidates for examination in diseases of the chest be established, and

WHEREAS, It is the desire of the American College of Chest Physicians to set standards higher and to cover a wide field for specialists in diseases of the chest,

BE IT RESOLVED, That the American College of Chest Physicians desires to go on record as supporting the establishment of an American Board for certification in diseases of the chest, and

BE IT FURTHER RESOLVED, That the Board of Regents of the American College of Chest Physicians, after a careful study of this situation by its Committee to Cooperate with the Advisory Board for Medical Specialties, seek the assistance of all of the specialty boards in securing, through the proper channels, the establishment of such a board.

At the semi-annual meeting of the Board of Regents held at Miami, Florida, November 3, 1946, the following resolution was presented to the Board of Regents:

BE IT RESOLVED, That the Committee to Cooperate with the Advisory Board for Medical Specialties be authorized to contact the above Advisory Board at their earliest convenience, and present the College proposal for the establishment of an American Board of Diseases of the Chest.

BE IT FURTHER RESOLVED, That the Chairman of the Committee be granted the power to request such members of the College as he deems advisable to appear with him before the Advisory Board for Medical Specialties.

This resolution was unanimously adopted.

J. Winthrop Peabody, M.D., *Chairman*, Washington, D. C.

College News

ARIZONA CHAPTER

Dr. C. A. Thomas, Tucson, President of the Arizona Chapter of the College, announces the following committee appointments:

Program Committee:

Harold Kohl, M.D., Tucson, *Chairman*
R. A. Wilson, M.D., Tucson
Leslie Smith, M.D., Phoenix

Medical Education Committee:

Daniel Mahoney, M.D., Tucson

Membership Committee:

Howell S. Randolph, M.D., Phoenix
Joseph Farness, M.D., Tucson

MARYLAND - DISTRICT OF COLUMBIA CHAPTER

The second meeting of the Maryland-District of Columbia Chapter of the College was held at the Hotel Statler, Washington, D. C., on October 3rd. Dr. William F. Rienhoff, Jr., presided.

The minutes of the previous meeting were read and accepted. Communications and Committee reports were read. A motion was made by Dr. Brantigan that the President appoint a Membership Committee consisting of nine members rather than three. This Membership Committee would consist of three members each from Maryland, the District of Columbia and West Virginia, each with its own chairman. The motion was seconded by Dr. David and carried unanimously.

Dr. Rienhoff suggested the advisability of stimulating interest among general practitioners in diseases of the chest. Along this line Drs. Coulter and Peabody suggested that members bring general practitioners to the meetings.

A discussion arose concerning the advantages and disadvantages of having more than one meeting annually. It was agreed that it would be fair to alternate the meetings among the three component states of the chapter.

NEW JERSEY CHAPTER

The New Jersey Chapter of the College held its Fall scientific meeting in the auditorium of the Newark Beth Israel Hospital on Wednesday, October 9, with approximately 100 physicians attending. The program for the meeting was published in the September-October issue of "Diseases of the Chest".

PACIFIC NORTHWEST DISTRICT CHAPTER

The annual meeting of the Pacific Northwest District Chapter of the College was held at Vancouver, British Columbia, on October 4-5. The program presented at the meeting was published in the preceding issue of the journal. Dr. Frank I. Terrill, Deer Lodge, Montana, was elected President of the Chapter; Dr. Grover Bellinger, Salem, Oregon, Vice-

President, and Dr. Florence A. Brown, Portland, Oregon, was re-elected as Secretary-Treasurer of the Chapter.

The Chapter members are deeply appreciative of the kind hospitality extended to them by the physicians in British Columbia. Dr. Elliott Harrison of Vancouver was in charge of the arrangements for the meeting. A very delightful tea was given for the wives of the doctors by the Woman's Medical Auxiliary at the home of Mrs. Harrison.

A banquet was held at the Vancouver Hotel on Friday, October 4, which was attended by approximately 80 persons. A very fine talk was given by Rev. E. D. Braden, Rector, Ryerson United Church. The wives of the visiting doctors were presented with beautiful corsages by the British Columbia doctors.

ANNUAL MEETING SOUTHERN CHAPTER

The Southern Chapter of the College met at the Hotel Alcazar, Miami, Florida, on Monday, November 4. More than one hundred physicians registered for the scientific sessions and the luncheon meeting and annual banquet were well attended. The new officers elected for the Chapter are as follows:

Dr. Paul A. Turner, Louisville, Kentucky, President
Dr. Herbert L. Mantz, Kansas City, Missouri, First Vice-President
Dr. Dean B. Cole, Richmond, Virginia, Second Vice-President
*Dr. Benjamin L. Brock, Oteen, North Carolina, Secretary-Treasurer

The Past Presidents of the Southern Chapter are: Dr. Paul A. Ringer, Asheville, North Carolina, Dr. Alvis E. Greer, Houston, Texas, and Dr. Carl C. Aven, Atlanta, Georgia. Dr. Paul A. Turner, the newly elected President of the Chapter has appointed the following committees:

Membership Committee:

Dr. Hollis Johnson, Nashville, Tennessee, *Chairman*
Dr. Robert E. Schwartz, Hattiesburg, Mississippi
Dr. David H. Shipp, Little Rock, Arkansas
Dr. M. Jay Flipse, Miami, Florida
Dr. Louis L. Friedman, Birmingham, Alabama

Medical Education Committee:

Dr. Alvis E. Greer, Houston, Texas, *Chairman*
Dr. I. B. Robbins, New Orleans, Louisiana
Dr. Carl C. Aven, Atlanta, Georgia
Dr. Otto C. Brantigan, Baltimore, Maryland
Dr. Robinson O. Joplin, Louisville, Kentucky

Program Committee:

Dr. David Waterman, Knoxville, Tennessee
Dr. Dean B. Cole, Richmond, Virginia
Dr. Herbert L. Mantz, Kansas City, Missouri

*Re-elected.

WISCONSIN CHAPTER

The second annual meeting of the Wisconsin Chapter was held at the Schroeder Hotel, Milwaukee, on Sunday, October 6. The following officers were elected:

Alfred A. Busse, M.D., Jefferson, *President*
Ethan Pfefferkorn, M.D., Oshkosh, *Vice-President*
Leon H. Hirsh, M.D., Milwaukee, *Secretary-Treasurer*

College Chapter News

W. W. Buckingham, M.D., Kansas City, Missouri, has been appointed Governor of the College for the State of Missouri, to complete the unexpired term of Herbert L. Mantz, M.D. Dr. Mantz was recently elected Regent of the College for Regional District No. 8.

Dr. Kenneth Wade Thompson, formerly Managing Editor of the Journal of Clinical Endocrinology and Clinical Professor of Surgery at Tufts College Medical School, has been appointed Medical Director of Roche-Organon, Inc.

The Friedman Lectures, which are given in honor of the first President and Founder, Reverend Dr. William S. Friedman, of the National Jewish Hospital, Denver, Colorado, were held on November 4 and 5 in cooperation with the University of Colorado School of Medicine and the Denver County Medical Society. The program included Dr. Edgar Mayer, F.C.C.P., New York, N. Y., Dr. Dwight Emary Harken, Boston, Massachusetts, Dr. Arthur M. Master, New York, N. Y., and Dr. Louis S. Goodman, Salt Lake City, Utah.

The following members of the American College of Chest Physicians have recently entered the Veterans Administration: Dr. Bax Baumwell, formerly at the California Sanatorium, Belmont, has assumed duties on the Tuberculosis Service, Veterans Administration Tuberculosis Hospital, Walla Walla, Washington. Dr. Andrew Nady has accepted an appointment as Chief of Tuberculosis Section, Veterans Administration Hospital, Tucson, Arizona. Dr. Nady formerly was Assistant Medical Director of the Tuberculosis Hospital, Oak Forest, Illinois. Dr. William G. Lewis, formerly Physician-in-Charge of the Indian Sanatorium at Albuquerque, New Mexico, has assumed the duties of Chief of Section, Tuberculosis, Veterans Administration Hospital, Walla Walla, Washington. Dr. Cecil L. Schultz has assumed duties in Tuberculosis at the Veterans Administration Tuberculosis Hospital, Oteen, North Carolina. Prior to accepting this appointment, Dr. Schultz was Medical Director of the Columbia Sanatorium at Philmont, New York.

ANNOUNCEMENT

The Scientific Program Committee, American College of Chest Physicians, will be pleased to receive manuscripts or abstracts for approval by the committee in connection with the 13th Annual Meeting of the College to be held in Atlantic City in June, 1947. Please address all communications to the Chairman of the committee.

Andrew L. Banyai, M.D., *Chairman*, Scientific Program Committee
Muirsdale Sanatorium, Milwaukee 13, Wisconsin

Burgess Gordon, M.D.
Philadelphia, Pennsylvania

Minas Joannides, M.D.
Chicago, Illinois

Obituaries

JAMES MARR BISAILLON

1882 - 1946

Dr. James Marr Bisailon died at his home in Portland, Oregon, on June 3, 1946, after a long illness. Dr. Bisailon graduated in 1911 from the University of Oregon Medical School and later took advanced study in Vienna and London. At the time of his death he was clinical professor of medicine at the University of Oregon Medical School. During the first world war Dr. Bisailon served as a contract surgeon of the army.

Dr. Bisailon was a Fellow of the American College of Chest Physicians, the American Medical Association and the College of Physicians. He was a member of the American Association of Thoracic Surgery and the North Pacific Society of Internal Medicine.

James M. Odell, M.D., *Governor for Oregon.*

ADAM LEO SZWAJKART

1895 - 1946

Dr. Adam Leo Szwajkart of Chicago, Illinois, died on May 24th of this year following a long illness. Dr. Szwajkart graduated from the University of Illinois College of Medicine in 1911. During World War I he served as a Captain in the Medical Corps. He was formerly a staff member at the Municipal Tuberculosis Sanitarium in Chicago, and later was made Acting Medical Superintendent of the North Riverside Division of the Municipal Tuberculosis Sanitarium.

Robert K. Campbell, M.D., *Governor for Illinois.*

X-RAY NEWS

Powers X-Ray Products, Inc., of Glen Cove, Long Island, announces a general expansion program designed to increase its x-ray service facilities as part of the recently announced New York State drive to wipe out tuberculosis.

Powers X-Ray has been named to handle the x-raying of all New York State civil service employes as the initial step in the twenty-year health drive announced last week by Governor Thomas E. Dewey.

Orders already have been placed for new mobile equipment, and the Powers organization is actively engaged in the manufacture of its magazine cassettes through which hundreds of full-sized x-rays may be taken in a single day.

The Powers mobile units, with complete x-ray equipment including power plant, will start some time next month their state-wide trek to reach every civil service worker in the State.

TUBERCULOSIS WITH ARRESTED DISEASE ELIGIBLE FOR NURSING TRAINING

The State Tuberculosis Sanatorium of Texas is receiving applications from ex-patients with arrested tuberculosis for training at their School of Nursing. Both men and women between the ages of 18 and 35 are eligible. During their two year training period candidates receive \$50.00 per month with full maintenance. For further information address, Miss Audra Mathison, Superintendent of Nurses, Sanatorium, Texas.

Positions Wanted and Available

POSITIONS AVAILABLE

Physician wanted, graduate of Grade A medical school, for routine sanatorium work. \$200.00 per month, full maintenance for self and family with furnished cottage. If interested please write Box 147A, American College of Chest Physicians, 500 N. Dearborn Street, Chicago 10, Illinois.

Assistant physician; approved tuberculosis sanatorium; all types of collapse therapy; salary includes full maintenance; apply, giving full particulars, State Sanatorium, Glencliff, New Hampshire.

Position available, resident physician, male, approved tuberculosis sanatorium, all types of collapse therapy, must be eligible for Michigan license, salary \$2400 to \$3000 per year, plus full maintenance. Apply, giving full particulars, to Medical Director, Oakland County Tuberculosis Sanatorium, Pontiac, Michigan.

Positions open for two resident physicians in Ohio sanatorium; 180 adult beds; complete thoracic surgery department; x-ray department; laboratory department; 80 physicians on visiting staff. Residency covers both medical and surgical patients. Appointment for one year or longer. Salary \$250 per month, no maintenance. Meals, room and laundry available at the sanatorium for \$35 per month. Interested physicians please write Box 144A, American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

Associate Medical Director wanted; hospital in Indiana. Minimum of three years experience in a recognized tuberculosis sanatorium, and preferably five years experience. For further particulars please write Box 145A, American College of Chest Physicians, 500 North Dearborn St., Chicago 10, Illinois.

Resident physician needed; hospital in Indiana. No tuberculosis training is required, but some experience is preferable. For further particulars please write Box 146A, American College of Chest Physi-

cians, 500 North Dearborn Street, Chicago 10, Illinois.

Assistant physician wanted in tuberculosis hospital in southeast Texas. Three thousand per year with complete maintenance to single man. Excellent opportunity to learn chest surgery and other collapse therapy. Good climate the year around. For additional information please address Box 148A, American College of Chest Physicians, 500 North Dearborn St., Chicago 10, Illinois.

Staff physician wanted at approved hospital, complete medical and surgical service, out-patient facilities, tuberculosis and other chest diseases. For additional information please address Box 149A, American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

POSITIONS WANTED

Fellow, American College of Chest Physicians, chest surgeon, bronchoscopist, well trained, formerly member of university teaching staff, desires position in sanatorium. For further information please write Box 228A, American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

Surgeon recently released from service interested in association with an established thoracic surgeon or clinic, or a position in a hospital or sanatorium, preferably in the capacity of surgeon with opportunity for private practice. Well trained in thoracic surgery and bronchoscopy. Good references. For further information please address Box 229A, American College of Chest Physicians, 500 North Dearborn Street, Chicago 10, Illinois.

Position wanted in thoracic surgery and bronchoscopy; full time institutional work or part-time and private practice. Fellow, American College of Chest Physicians, being released from service. For further information please address Box 231A, American College of Chest Physicians, 500 North Dearborn St., Chicago 10, Illinois.

DISEASES OF THE CHEST

AUTHOR INDEX

Volume XII, January - December, 1946

- | | | | |
|--|-----|--|-----|
| <i>Alarcon, Donato G.</i> Tuberculosis Among Sanatorium Personnel..... | 336 | <i>Charr, Robert, Heinz Lorge and Nathan H. Heiligman.</i> Artificial Pneumothorax and Its Effect Upon the Pulmonary Tissues of Normal Rabbits | 117 |
| <i>Atwell, Sherman W.</i> Roentgenographic Scanning of the Chest..... | 222 | <i>Davison, Richard.</i> Results of Thoracoplasty — 933 Cases, 1,868 Operations | 431 |
| <i>Barach, Alvan L.</i> Continuous Immobilization of the Lungs by Residence in the Equalizing Pressure Chamber in the Treatment of Pulmonary Tuberculosis. Discussion by Minas Joannides | 521 | <i>Diamond, Norman.</i> Pulmonary Cavitation, Difficulty in Differential Diagnosis by X-ray..... | 422 |
| <i>Bass, Maj. H. E., Lt. Col. S. I. Kooperstein, Lt. Col. M. M. Friedman and Col. G. H. Kastlin.</i> Pulmonary Coccidioidomycosis. Discussion by Capt. H. R. Barnes and M. D. Bonner..... | 371 | <i>Donaldson, J. M., Jr. and Hewell C. Samuel.</i> The Treatment of Tuberculous Empyemas with Tyrothricin | 61 |
| <i>Bernstein, Arthur, Emmanuel Klosk and Aaron E. Parsonnet.</i> Spontaneous Hemothorax—A Discussion of the Problem Based on Three Cases | 394 | <i>Friedman, J. H., G. J. Kastlin and S. I. Kooperstein.</i> The Psychosomatic Factors in Pulmonary Tuberculosis | 539 |
| <i>Bernstein, Maj. David.</i> Concurrence of Superior Pulmonary Sulcus Tumor and Pulmonary Tuberculosis | 436 | <i>Gomez, Fernando D.</i> Experiences with B.C.G. in Latin America | 348 |
| <i>Branco, Joao Martins Castello.</i> Thoracoscopy as a Method of Exploration in Penetrating Injuries of the Thorax (Preliminary Report)..... | 330 | <i>Grow, John B.</i> Chronic Pleural Empyema (Its Surgical Treatment).... | 26 |
| <i>Brown, E. A., C. Nobili, T. Sannella and G. P. Wadsworth.</i> Dyspnoea and Diminished Vital Capacity as a Symptom and a Sign in Hay Fever | 205 | <i>Hanks, Robert J.</i> Nebulized Penicillin in the Treatment of Respiratory Infections | 242 |
| <i>Bueno, Marcio M.</i> The Epidemiology of Tuberculosis in Brazil and Vaccination with B.C.G..... | 343 | <i>Harper, Frank T.</i> Iodized Oil in the Treatment of Chronic Bronchitis.... | 228 |
| <i>Calero, Carlos.</i> Pulmonary Actinomycosis—Report of the First Case Observed in the Isthmus of Panama.... | 402 | <i>Hayes, E. W.</i> Rev. Pulmonary Tuberculosis—A Handbook for Students and Practitioners, by R. Y. Keers and B. G. Rigden..... | 275 |
| <i>Carr, Duane and John S. Harter.</i> Lobectomy and Pneumonectomy in Pulmonary Tuberculosis. Discussion by R. Kyle Brown..... | 387 | <i>Hulse, William F.</i> Obstructing Tuberculosis of the Main Bronchi..... | 416 |
| | | <i>Humphries, M. K., Jr.</i> Laryngeal Tuberculosis | 129 |
| | | <i>Jacobs, Sydney.</i> The Unexpandable Lung | 111 |
| | | <i>Joannides, Minas.</i> Acute Primary Diaphragmitis (Hedblom's Syndrome) | 89 |

- Joannides, Minas*. Rev. Pneumoperitoneum Treatment, by Andrew L. Banyai 508
- Kaufman, Israel*. Bronchial Asthma (A Case Report) 251
- Klassen, Karl P., Myron D. Miller and George M. Curtis*. The Treatment of Tuberculous Empyema 51
- Lloyd, Milton S.* The Chest Specialist: His Training and Services 153
- Marais, David P.* The Tuberculosis Problem of the Union of South Africa 254
- Matson, Ralph C., William S. Conklin and Sheldon Domm*. Evaluation of Various Surgical Procedures in the Treatment of Pulmonary Tuberculosis 40
- Meyer, W. L.* Non-Coagulating Intrapleural Hemorrhage Following Damage to Intercostal Vessels 444
- Morris, Everett*. Induced Pneumoperitoneum in the Treatment of Advanced Pulmonary Tuberculosis in Children 121
- Myers, J. A.* Chemotherapy in Tuberculosis. Editorial 72
- Myers, J. A.* President's New Year Message 74
- Myers, J. A.* Retiring President's Address 451
- Myers, J. A.* Specialty Boards. Editorial 260
- Myers, J. A.* The Importance of Specific Information in Diagnosis. Editorial 165
- Myers, J. A.* Tuberculosis in Hospital Personnel. Editorial 354
- Ogden, William E.* Foreseeing and Forestalling Tuberculosis. Introduction to Symposium 277
- Ogden, W. E., G. C. Anglin and W. C. Kruger, et al.* Foreseeing and Forestalling Tuberculosis — A Symposium (A Scheme in Operation Twenty Years) 280
- Ornstein, George G. and Myron Herman*. The Management of Pure Tuberculous and Mixed Infection Empyemata 1
- Pfuetze, K. H., R. P. Glover, E. F. White, Jr., W. H. Feldman and H. C. Hinshaw*. Clinical Use of Streptomycin in the Treatment of Tuberculosis 515
- Raab, Walter*. Tuberculous Empyema Treated with Vitamin A-D Concentrate (A Preliminary Report) 68
- Raab, Walter*. Vitamin D — Its Bactericidal Action 409
- Robitzek, Edward H., George G. Ornstein, Philip Slater and Strashimir A. Petroff*. Diasone in the Treatment of Pulmonary Tuberculosis 185
- Rothstein, Emil and H. B. Pirkle*. Pulmonary Disease Secondary to Cardiospasm, with Acid-fast Bacilli in the Sputum (Case Report) 232
- Schneider, Louis*. Separation Center Chest Survey 147
- Schwartz, Herbert F.* Role of the Tuberculosis Sanatorium in the Community 447
- Seabra, Paulo*. Oxidase and Tuberculosis 550
- Simons, E. J.* Rev. Mass Radiography of the Chest, by Herman E. Hilleboe and Russell H. Morgan 274
- Smart, Elliott P. and Robert W. Clarke*. A Tuberculosis Survey of a Rural Mountain County 246
- Theodos, Peter A.* Tuberculosis in Greece: Present Conditions and Future Considerations 571
- Weissman, Herman*. Primary Endothelioma of the Pleura. Study of Two Cases 562
- Wiese, E. Robert*. Bulla of the Lung 238

DISEASES OF THE CHEST

SUBJECT INDEX

Volume XII, January - December, 1946

- A**CTINOMYCOSIS, Pulmonary. *Carlos Calero*..... 402
- Acute Primary Diaphragmitis (Hedblom's Syndrome). *Minas Joannides* 89
- Africa, Tuberculosis Problem. *David P. Marais*..... 254
- Artificial Pneumothorax and Its Effect Upon the Pulmonary Tissues of Normal Rabbits. *Robert Charr, Heinz Lorge and Nathan H. Heiligman*..... 117
- Asthma, Bronchial. *Israel Kaufman* 251
- B**CG—Experiences in Latin America. *Fernando D. Gomez*..... 348
- B.C.G. Vaccination in Brazil. *Marcio M. Bueno*..... 343
- Brazil, Epidemiology of Tuberculosis and B.C.G. Vaccination. *Marcio M. Bueno*..... 343
- Bronchial Asthma (A Case Report). *Israel Kaufman*..... 251
- Bulla of the Lung. *E. Robert Wiese*..... 238
- C**AVITATION, Pulmonary—. *Norman Diamond*..... 422
- Chemotherapy in Tuberculosis. Edit. 72
- Chest, Roentgenographic Scanning. *Sherman W. Atwell*..... 222
- Chest Specialist: His Training and Services. *Milton S. Lloyd*..... 153
- Chronic Bronchitis, Iodized Oil Treatment. *Frank T. Harper*..... 228
- Chronic Pleural Empyema (Its Surgical Treatment). *John B. Grow*..... 26
- Clinical Use of Streptomycin in the Treatment of Tuberculosis. *K. H. Pfuetze, R. P. Glover, E. F. White, Jr., W. H. Feldman and H. C. Hinshaw*..... 515
- Coccidioidomycosis, Pulmonary. *Maj. H. E. Bass, et al*..... 371
- Concurrence of Superior Pulmonary Sulcus Tumor and Pulmonary Tuberculosis. *Major David Bernstein* 436
- Continuous Immobilization of the Lungs by Residence in the Equalizing Pressure Chamber in the Treatment of Pulmonary Tuberculosis. *Alvan L. Barach*..... 521
- D**IAGNOSIS, Importance of Specific Information. Edit. 165
- Diaphragmitis, Acute Primary. *Minas Joannides*..... 89
- Diasone in the Treatment of Pulmonary Tuberculosis. *Edward H. Robitzek, George G. Ornstein, Philip Slater and Strashimir A. Petroff*.... 185
- Dyspnoea and Diminished Vital Capacity as a Symptom and a Sign in Hay Fever. *Ethan Allen Brown, Conrad Nobili, Theodore Sannella and George P. Wadsworth*..... 205
- E**MPYEMA, Surgical Treatment. *John B. Grow*..... 26
- Empyema, Treatment with Tyrothricin. *J. M. Donaldson, Jr. and Howell C. Samuel*..... 61
- Empyema, Tuberculous. Treated with Vitamin A-D Concentrate. *Walter Raab*..... 68
- Empyema, Tuberculous. Treatment of—. *K. P. Klassen, et al*..... 51

- Empyemata, Management of—
George G. Ornstein and Myron
Herman 1
- Epidemiology of Tuberculosis in Bra-
zil and Vaccination with B.C.G.
Marcio M. Bueno 343
- Evaluation of Various Surgical Proce-
dures in the Treatment of Pul-
monary Tuberculosis. Ralph C.
Matson, William S. Conklin and
Sheldon Domm 40
- Experiences with B.C.G. in Latin
America. Fernando D. Gomez 348
- F**ORESEEING and Forestalling Tu-
berculosis. Introduction to Sym-
posium. William E. Ogden 277
- Foreseeing and Forestalling Tubercu-
losis. Symposium: A Scheme in
Operation Twenty Years. W. E.
Ogden, G. C. Anglin and W. C.
Kruger, et al 280-329
- G**REECE, Tuberculosis in—. Peter
A. Theodos 571
- H**AY Fever, Symptom and Sign—
Ethan Allan Brown, et al 205
- Hemothorax, Spontaneous. Arthur
Bernstein, et al 394
- Hemorrhage, Intrapleural—. W. L.
Meyer 444
- Hendricks, Charles M., President 456
- I**MPORTANCE of Specific Informa-
tion in Diagnosis. Edit. 165
- Induced Pneumoperitoneum in the
Treatment of Advanced Pulmonary
Tuberculosis in Children. Everett
Morris 121
- Iodized Oil in the Treatment of
Chronic Bronchitis. Frank T. Har-
per 228
- L**ARYNGEAL Tuberculosis. M. K.
Humphries, Jr. 129
- Latin America, Experiences with
B.C.G. Fernando D. Gomez 348
- Lobectomy and Pneumonectomy in
Pulmonary Tuberculosis. Duane
Carr and John S. Harter. Discus-
sion by R. Kyle Brown 387
- Lung, Bulla of—. E. Robert Wiese 238
- M**ANAGEMENT of Pure Tubercu-
lous and Mixed Infection Em-
pyemata. George G. Ornstein and
Myron Herman 1
- Mass Radiography of the Chest. Her-
man E. Hilleboe and Russell H.
Morgan. Rev. 274
- N**EBULIZED Penicillin in the
Treatment of Respiratory Infec-
tions. Robert J. Hanks 242
- Non-Coagulating Intrapleural Hem-
orrhage Following Damage to In-
tercostal Vessels. W. L. Meyer 444
- O**BITUARIES:
Adamski, Alexander William 367
Ashworth, Osbourne O. 367
Bisaillon, James Marr 603
Carney, Roscoe Patrick 183
Chiple, Bascomb Lanier 273
Holmes, Champneys Holt 510
Kibler, Charles Samuel 273
Randolph, Victor Strong 182
Sheppard, Benjamin Arthur 182
Sicca, Michele Pietro 183
Spector, Hyman I. 512
Szwajkart, Adam Leo 603
- Obstructing Tuberculosis of the Main
Bronchi. William F. Hulse 416
- Oxidase and Tuberculosis. Paulo Sea-
bra 550
- P**LEURA, Primary Endothelioma.
Herman Weissman 562
- Pneumoperitoneum Treatment. An-
drew L. Banyai. Rev. 508
- Pneumoperitoneum Treatment in
Children with Advanced Tubercu-
losis. Everett Morris 121

- President's New Year Message. *J. A. Myers* 74
- Primary Endothelioma of the Pleura, Study of Two Cases. *Herman Weissman* 562
- Psychosomatic Factors in Pulmonary Tuberculosis. *J. H. Friedman, G. J. Kastlin and S. I. Kooperstein* 539
- Pulmonary Actinomycosis—Report of the First Case Observed in the Isthmus of Panama. *Carlos Calero* 402
- Pulmonary Cavitation, Difficulty in Differential Diagnosis by X-ray. *Norman Diamond* 422
- Pulmonary Coccidioidomycosis. *Maj. H. E. Bass, Lt. Col. S. I. Kooperstein, Col. M. M. Friedman and Col. G. H. Kastlin*. Discussion by Capt. H. R. Barnes and M. D. Bonner 371
- Pulmonary Disease Secondary to Cardiospasm, with Acid-fast Bacilli in the Sputum (Case Report). *Emil Rothstein and H. B. Pirkle* 232
- Pulmonary Sulcus Tumor and Pulmonary Tuberculosis. *Maj. David Bernstein* 436
- Pulmonary Tuberculosis—A Handbook for Students and Practitioners. *R. Y. Keers and B. G. Rigden*. Rev. 275
- Pulmonary Tuberculosis, Lobectomy and Pneumonectomy. *Duane Carr and John S. Harter* 387
- Pulmonary Tuberculosis, Surgical Procedures in—. *Ralph C. Matson, et al* 40
- R**ESPIRATORY Infections, Treatment with Nebulized Penicillin. *Robert J. Hanks* 242
- Results of Thoracoplasty—933 Cases, 1,868 Operations. *Richard Davison* 431
- Retiring President's Address. *Jay Arthur Myers* 451
- Roentgenographic Scanning of the Chest. *Sherman W. Atwell* 222
- Role of the Tuberculosis Sanatorium in the Community. *Herbert F. Schwartz* 447
- S**ANATORIUM, Role in Community. *Herbert F. Schwartz* 447
- Sanatoriums, Tuberculosis Among Personnel. *Donato G. Alarcon* 336
- Separation Center Chest Survey. *Louis Schneider* 147
- Specialty Boards. Edit. 260
- Spontaneous Hemothorax—A Discussion of the Problem Based on Three Cases. *Arthur Bernstein, Emmanuel Klosk and Aaron E. Parsonnet* 394
- Streptomycin, Clinical Use in Treatment of Tuberculosis. *K. H. Pfuetze, et al* 515
- Surgical Treatment in Pulmonary Tuberculosis. *Ralph C. Matson, et al* 40
- Survey, Chest. *Louis Schneider* 147
- Survey, Tuberculosis. *Elliott P. Smart and Robert W. Clarke* 246
- T**HORACOPLASTY, Results—. *Richard Davison* 431
- Thorascoscopy as a Method of Exploration in Penetrating Injuries of the Thorax (Preliminary Report). *Joao Martins Castello Branco* 330
- Thorax, Injuries—. *J. M. Castello Branco* 330
- Treatment of Pulmonary Tuberculosis, Immobilization of Lungs—. *A. L. Barach* 521
- Treatment of Pulmonary Tuberculosis with Diasone. *E. H. Robitzek, et al* 185
- Treatment of Tuberculosis with Streptomycin—. *K. H. Pfuetze, R. P. Glover, E. F. White, Jr., W. H. Feldman, and H. C. Hinshaw* 515
- Treatment of Tuberculous Empyema. *Karl P. Klassen, Myron D. Miller, and George M. Curtis* 51

- Treatment of Tuberculous Empyemas with Tyrothricin. *J. M. Donaldson, Jr., and Hewell S. Samuel*..... 61
- Tuberculosis Among Sanatorium Personnel. *Donato G. Alarcon*..... 336
- Tuberculosis, Chemotherapy in—
Edit. 72
- Tuberculosis in Greece: Present Conditions and Future Considerations. *Peter A. Theodos*..... 571
- Tuberculosis in Hospital Personnel. Edit. 354
- Tuberculosis, Laryngeal. *M. K. Humphries, Jr.*..... 129
- Tuberculosis, Obstructing Main Bronchi. *William F. Hulse*..... 416
- Tuberculosis Problem of the Union of South Africa. *David P. Marais*..... 254
- Tuberculosis, Psychosomatic Factors in—. *J. H. Friedman, et al*..... 539
- Tuberculosis Survey of a Rural Mountain County. *Elliott P. Smart, and Robert W. Clarke*..... 246
- Tuberculosis, Symposium. Foreseeing and Forestalling Tuberculosis. Introduction, *William E. Ogden*. —A Scheme in Operation Twenty Years. *W. E. Ogden, et al*..... 280-329
- Tuberculous Empyema Treated with Vitamin A-D Concentrate (A Preliminary Report). *Walter Raab*..... 68
- UNEXPANDABLE Lung. *Sydney Jacobs*..... 111
- VITAMIN D—Its Bactericidal Action. *Walter Raab*..... 409

